THE THERAPEUTIC GAZETTE

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PUBLISHER'S ANNOUNCEMENT.

With the THERAPEUTIC GAZETTE—the oldest, strongest, most widely circulated of our three medical journals—we have consolidated the MEDICAL AGE and MEDICINE, the current issue constituting the initial number of the united publications.

It was patent to us that we could best serve the interests of the medical profession by massing our forces and giving our undivided thought and energies to the making of a single medical journal—a journal embracing all those distinctive features which, for the past thirty years, have given prestige to the THERAPEUTIC GAZETTE, at the same time retaining the salient and practical features of MEDICINE and the MEDICAL AGE.

"THE THERAPEUTIC GAZETTE, incorporating MEDICINE and the MEDICAL AGE," is the title of the consolidated journals. The publication will be under the editorship of Dr. Hobart Amory Hare and Dr. Edward Martin, who for the past fifteen years have been associated in the editorial conduct of the THERAPEUTIC GAZETTE, which is a guarantee of the continuance of its useful characteristics. Among its contributors will be Dr. Harold N. Moyer, formerly the editor of *Medicine;* Dr. F. W. Mann, formerly the editor of the *Medical Age*—both able journalists and practitioners—and a large number of other eminent writers and teachers who are recognized as leaders in medical thought throughout the world.

The greater THERAPEUTIC GAZETTE will be conducted so as to meet the needs of active practitioners, and it will be, in the broadest sense, a representative journal of practical therapeutics.

THE PUBLISHER.

ORIGINAL COMMUNICATIONS.

AN ANALYSIS OF THE KIDNEY CONDITION OF EIGHT HUNDRED CASES OF SCARLET FEVER TREATED WITH ROUTINE DOSES OF CHLORAL HYDRATE: THE ANALYSIS CONTRASTED WITH SEVEN HUNDRED AND FIFTY-SIX CASES HAVING THE USUAL REMEDIES.

BY B. FRANKLIN ROYER, PHILADELPHIA,

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During the latter part of 1904 we began a study in the Municipal Hospital to determine the value of chloral hydrate in the treatment of scarlet fever. As long ago as 1896 Dr. James C. Wilson advocated routine doses of this drug in the treatment of scarlatina. Dr. Wilson believes that he secures an increased diuresis thirty-six to forty-eight hours after its administration has been begun. He thinks that in some way chloral protects the functionating part of the kidney tissues, that the nervous symptoms are greatly modified, that the itching is allayed, and that the patient is made more comfortable.

In beginning this study we were skeptical as to the value of this drug in scarlet fever. We believed that rest in bed with good nursing, simple diet, and large quantities of pure water were the only useful adjuncts to be used routinely. We fully expected to prove chloral hydrate valueless in the treat-

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ment of this disease. A few weeks' trial, however, convinced us that Dr. Wilson's claims were for the most part easily proven, and that chloral hydrate did appear to be the most useful remedy yet advocated in the treatment of scarlatina. Dr. Wilson's claim that the patient is made more comfortable is plainly evident to those who use chloral; so too with his claim for the amelioration of the nervous symptoms and the control of itching.

We next turned our attention toward danger-signals, more particularly toward evidences of circulatory depression. We were bound to the universal teaching that chloral hydrate is a circulatory depressant and dangerous in asthenic conditions. We naturally expected to find this drug dangerous to many cases. After having treated nearly a thousand patients with doses of sufficient size to produce light somnolence, we feel that chloral hydrate does not materially depress the circulation. We believe that in no instance did the drug act clinically as a serious depressant. We have given it to patients greatly prostrated on admission, and have discontinued it after a few doses were given because of our prejudice against the drug and of our early training. After having a larger experience we rarely discontinued its use no matter what the degree of depression might be.

One claim made by Dr. Wilson, however, we were unable to confirm, viz., that of early diuresis. We undoubtedly do get an increased flow of urine twenty-four to forty-eight hours after the patient has been committed to our care. We meet with this same increase in flow of urine in patients treated by other remedies. We are inclined to attribute this increased flow of urine to better nursing, to the systematic use of water in definite quantities, insisted upon whether the patient wants it or not, and to the greater ease with which liquids are swallowed as the angina subsides.

The particular study undertaken at this time relates to the kidney condition met with in the postfebrile period. We have studied eight hundred cases which were treated with routine doses of chloral hydrate given in quantities sufficiently large to produce light somnolence, and have continued its administration in this dose five or six days after the fever subsided. A series of 756 patients treated by the usual remedies (a few of them perhaps having a dose of chloral to quiet extreme restlessness at night; most of them, however, having no chloral at any time) were analyzed in exactly the same way. The patients in each series were parallel cases as nearly as we could select them. All histories were excluded in each series where other infectious disease or other serious illness was combined with scarlet fever. Three patients died in the chloral series, and four died in the usual remedy group. We find that in the febrile period no material difference was found in the number of those having either mild, transient, or severe nephritis. In the postfebrile period it will be seen that of the 300 having routine doses of chloral hydrate the percentage of those having postfebrile albuminuria is 4.25 as against 5.68 in the series treated without chloral; in those having a transient postfebrile nephritis 3.50 as against 5.29 per cent without chloral, and of those having severe postfebrile nephritis 2 as against 2.38 per cent without chloral; in the total of all forms of postfebrile nephritis, 5.50 per cent in those having chloral, as against 7.76 per cent in those not having chloral, or the apparent total saving of 2.17 per cent of postfebrile nephritis.

POSTFEBRILE CONDITION OF KIDNEYS—CHLORAL SERIES.

Treatment.		Postfebrile albuminuria.	Postfebrile transient nephritis.	Postfebrile severe nephritis.
Chloral hydrate alone	22	0	1	0
Chloral hydrate and antitoxin (immunizing or larger dose)	26	2	0	0
Chloral hydrate and usual remedies	221	12	10	1
Chloral hydrate, usual remedies, and antitoxin	531	20	17	15
Total chloral hydrate	800	34	28	16

Total number treated with chloral..... 800
Total number developing postfebrile nephritis..... 44
Percentage developing postfebrile nephritis.....5.50

POSTFEBRILE CONDITION OF KIDNEYS—USUAL REMEDY SERIES.

Treatment.	Postfebrile albuminuria.	Postfebrile transient nephritis.	Postfebrile severe nephritis.
Usual remedies alone.526	28	26	13
Usual remedies and antitoxin.....230	15	14	5
Total having usual remedies.....756	43	40	18

Total number having usual remedies 756
Total number developing postfebrile nephritis..... 58
Percentage developing postfebrile nephritis.....7.76

It will be seen in the first table presented that antitoxin was used in many cases of each series tabulated. There may be those who believe that antitoxin irritates kidneys and that it may even cause nephritis. We have therefore separately classified those having antitoxin in the succeeding table. It apparently demonstrates that nephritis is a little more frequent in those patients having antitoxin.

CLASSIFIED IN ANTITOXIN GROUPS.

Treated by.	Total.	Total nephritis.	Percentage.
Chloral hydrate..... 22 Chloral hydrate and usual remedies.....221	243	12	4.93
Chloral and antitoxin. 26 Chloral, other remedies, and antitoxin..531	557	32	5.76
Grand total..... ...	800	44	5.50
Usual remedies.....526	526	39	7.43
Usual remedies and antitoxin.....230	230	19	8.26
Total.....	756	58	7.76

Of this series 243 had chloral hydrate and usual remedies—12 developed nephritis, a percentage of 4.93; 557 had chloral and the usual remedies, and were either immunized or given larger doses where attacks were anginose—32 developed nephritis, a percentage of 5.76. Of those not having chloral, 526 were given the usual remedies alone—39 developed nephritis, a percentage of 7.43; 230 had the usual remedies and antitoxin, 19 with nephritis—a percentage of 8.26.

Here just a word of explanation. It has been our custom at the hospital to give a dose of 5000 units or more of diphtheric antitoxin to all anginose cases of scarlet fever. In these antitoxin groups we have all the severe cases of anginose scarlet fever. The number in each group not having antitoxin is practically *nil*. It is from the antitoxin group then that nephritis is to be expected. This explanation is made so that antitoxin may not be misjudged.

It is believed that some inquiry as to the day of disease when postfebrile nephritis most frequently develops might be of interest. The third table presented shows the day in the disease when nephritis may be anticipated. The period of greatest danger is shown to be the period from the twentieth to thirty-second day, or the third week and the early part of the fourth week.

A further division of the 800 patients having chloral shows that of the 16 having severe postfebrile nephritis, two had febrile albuminuria, one transient febrile nephritis, and three had severe febrile nephritis, one of which had severe nephritis on admission. In two patients of this group the nephritis extended to the postfebrile period. Eleven patients of this group escaped kidney symptoms in the febrile period and are classified as scarlatina simplex. Five are classified as scarlatina anginosa. Fifteen of this group showed hyaline and granular casts in the urine, five epithelial casts, and two blood casts. In three marked edema is noted; in three puffiness about the eyes alone is noted.

NEPHRITIS IN CHLORAL SERIES.

Classified to show day of disease postfebrile nephritis developed.

	3d week 12							4th week 18							5th week 5							6th week 4						
Day of disease.....	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
No. developed nephritis...	*5	1	1	0	0	2	3	0	6	1	2	2	5	2	1	2	0	1	0	0	2	1	1	0	0	2	1	0

Period of nephritis, postfebrile.

*Two continued from febrile period.

In three the notes show the quantity of urine to be scanty, in ten the quantity is fair, and in three a good quantity is noted. In three patients in this group albumin was found from one to three days before casts appeared.

Of the 28 having transient postfebrile nephritis, seven had febrile albuminuria. Nineteen of this group had scarlatina simplex, eight had scarlatina anginosa, and one had scarlatina hemorrhagica. All of this group escaped nephritis during the febrile period. In 20 urines hyaline casts were noted, in 25 granular casts were found, in four epithelial casts were seen, two showed blood casts, and one had leucocyte casts. Two are noted as having marked edema, two puffiness about the eyes. One showed scanty urine, two fair quality, 25 good quality, one of which had polyuria. Five of this group showed albuminuria from one to three days before casts were demonstrable. In two of this group a trace of albumin could be demonstrated for fifteen days before casts were found.

The following conclusions may be drawn:

First, chloral hydrate is of distinct value in the treatment of scarlet fever, and when used in doses of sufficient size to secure light somnolence does not seem to be a circulatory depressant.

Second, chloral hydrate ameliorates nervous symptoms better than any remedy yet suggested in the treatment of scarlatina.

Third, chloral hydrate allays the itching of the skin often found annoying in scarlet fever.

Fourth, when chloral hydrate is given routinely during the febrile period and for some days thereafter, postfebrile nephritis appears to be less frequent.

Fifth, this study would seem to justify the more extended use of chloral in the treatment of scarlet fever, and a more detailed study as to how it acts on the kidney itself.

THE TREATMENT OF GONOCOCCIC CONJUNCTIVITIS, WITH SPECIAL REFERENCE TO THE SILVER SALTS.[1]

BY G. E. DE SCHWEINITZ, M.D.,
Professor of Ophthalmology in the University of Pennsylvania.

Purulent conjunctivitis caused by the entrance of the gonococcus of Neisser into the conjunctival sac occurs in three forms: As gonococcic conjunctivitis in adults, which usually can be traced to its source of contagion from an acute gonorrhea or a gleet, or from contact with soiled fingers or linen, or from an eye similarly affected; as gonoblennorrhea of young girls who are the subjects of gonococcic vaginitis;[2] as conjunctivitis neonatorum (ophthalmia neonatorum), caused by the introduction into the eye of the infecting material from some portion of the genito-urinary tract of the mother at the time of or shortly after birth.

Referring to the first of these forms of gonorrhea of the conjunctiva, namely, gonococcic conjunctivitis of adults, with the symptoms of which you are now familiar, I desire to say a few words in regard to the treatment, with special reference to (*a*) the most satisfactory irrigating fluid; (*b*) the local use of cold; (*c*) scarification of the conjunctiva; and (*d*) the comparative value of certain of the salts of silver.

Ordinarily, the freely produced pus may be removed by frequent irrigations with a saturated solution of boric acid, a solution of bichloride of mercury, 1:10,000, or one of cyanide of mercury, 1:5000. In general terms it may be said that the use of strong solutions of most germicides—for example, bichloride of mercury—is not advisable, because they cannot be employed in a strength which would be bactericidal lest they injure the cornea and add to the danger which the treatment is intended to avert. These

[1] A clinical lecture delivered in the Hospital of the University of Pennsylvania.

[2] Young boys occasionally have gonococcic conjunctivitis, contracted from various sources of infection—for example, sleeping with adults who have gonorrhea, from soiled linen or towels, and, rarely, from an acquired urethral gonorrhea.

solutions must be regarded simply as cleansing agents, and not as specific medicaments, and hence boric acid solution is satisfactory and safe.

One remedy, however, has a more particular relationship to the cure of this disease, namely, permanganate of potassium in a solution of the strength of 1 to 2000 to 1 to 5000, used copiously, a pint at a time, in continuous irrigation after the manner of Kalt. These irrigations should be employed three or four times a day, according to the severity of the case and the quantity of the discharge. They are not applicable to, or necessary for, all cases, but should be reserved for those, only too often encountered, which fail to show improvement with those remedies which have been and will be mentioned. Under suitable conditions their value is great.

During the early stages of florid gonococcic conjunctivitis, provided the patient is robust and the cornea is not involved, the local application of cold is a useful agent. Upon a block of ice square compresses of gauze are laid and thoroughly chilled. These in turn are placed upon the swollen lids, and as frequently changed, at least every half minute, as may be needful to keep up a uniform cold impression. According to their effect, they may be used almost continuously, or every two or three hours for twenty minutes at a time.

Not all ophthalmic surgeons are in accord as to the value of cold applications under these circumstances. For example, Eugene Fick believes that they are "superfluous, if not actually harmful," and Myles Standish concludes that "the application of cold is at least of doubtful value, and that probably its effect is harmful."

The normal temperature of the lower conjunctival fold is about 96° F.; under the influence of inflammation it rises, and in the disease under consideration, according to some investigations of Standish, it may reach 100° F. The growth of the gonococcus is inhibited by a temperature of 86° F.; but it is doubtful if by any safe application of cold the temperature of the conjunctival sac can be reduced to this degree, and therefore an actual stopping of the growth of the gonococci cannot be expected from this treatment. Knies, however, has shown that these microörganisms develop only slowly at a temperature of 90° to 92° F., and John Weeks has demonstrated that by a proper use of cold the conjunctival temperature may be lowered to 92° F., at which temperature there is undoubted retardation of the growth of the gonococci. Hence cold is a useful remedy in this respect, and, moreover, it gives the patient relief from severe suffering.

According to my experience, cold properly applied during the first thirty-six hours of the disease, provided the nutrition of the cornea is intact, is an excellent remedy, productive of great comfort to the patient, and I have yet to see a case in which the slightest harm could be attributed to its use.

In many cases of gonococcic conjunctivitis there are marked chemosis and infiltration of the ocular conjunctiva, so that a hard ring of swollen tissue surrounds the cornea, which appears to be lying at the bottom of a small pit. Such a condition of affairs naturally shuts off the nutrition of the cornea, and unless relief is speedily given ulceration and sloughing of the cornea will follow. Nothing in my experience equals in value the effects of scarification of the infiltrated tissue, as follows: With a sharp Graęfe knife, radial incisions from within outward are made through the entire depth of the swollen tissue, and repeated on succeeding days if the chemosis and infiltration return. Great care must be taken not to scratch or cut the cornea during the necessary manipulations. After the scarification, the conjunctival sac should be gently irrigated with a saturated boric acid solution, until the bleeding and serous oozing cease.

Thus far we have considered remedies, with, perhaps, the single exception of permanganate of potassium, which, useful as they are, have no special action in controlling the disease we are discussing—that is to say, they are not germicides, or, rather, they cannot be employed safely in a strength which renders them actively germicidal. To render aid in this respect, nitrate of silver has maintained an

important relationship to the therapeutics of gonococcic conjunctivitis, and from a period long anterior to the discovery of the gonococcus of Neisser and to bacteriological examination it has been employed as a potent remedy in the treatment of purulent conjunctival diseases. It acts as an astringent, a superficial caustic, a germicide, and an alterative, and continues to be, in my experience, the most satisfactory remedy in this disease, *provided it is properly applied,* as follows: The conjunctival sac is first thoroughly irrigated and all pus and lymph carefully washed away. Next, both lids are everted so as to obtain full exposure of the swollen tarsal conjunctiva. With a small cotton mop, which has been dipped into a freshly prepared two-per-cent (gr. x-f℥j) solution of nitrate of silver, the conjunctiva thus exposed is gently but thoroughly painted until a white film, due to the formation of chloride of silver and coagulated albumin, forms. With a physiologic salt solution the surface is next irrigated until every particle of the white film which has formed is washed away, and a clean red surface remains. The lids are then restored to their normal position and the sac once more irrigated. By this means all the nitrate of silver is neutralized, and all substances which might irritate or injure the cornea are removed. Finally, iced compresses are applied for five or ten minutes. It is usually not necessary to make this application more than once a day, and it should always be made either by the physician in charge or by a suitably trained nurse. The solution should never be dropped into the conjunctival sac, but painted over the surface of the mucous membrane, and must always be neutralized in the manner described.

If nitrate of silver is carelessly used, or imperfectly neutralized, or applied in too strong a solution, it is liable to do harm and defeat the very object for which it is employed, and doubtless in many instances, in the absence of proper precautions or imperfect technique, it has been followed by a reactive irritation which was distressing, or an injury to the corneal epithelium which was positively harmful. Therefore, when some years ago various preparations of silver, generally described as the "newer salts of silver," began to make their appearance, they were hailed with satisfaction and freely used in place of the nitrate of silver. At the present time there are about fifteen of these compounds of silver available, but I have time to speak of only a few of them, and especially of protargol and argyrol.

When protargol was introduced, about ten years ago, it was widely employed and enthusiastically indorsed by many surgeons, because it was believed to possess the necessary bactericidal qualities and to be free from the irritating properties of nitrate of silver. The number of its advocates have materially lessened, although it continues to be used by many physicians.

In a notable investigation of the comparative value of the silver salts in the treatment of gonorrheal conjunctivitis, published by Myles Standish in 1904, and based upon a large experience in this disease in Gardner Building, attached to the Massachusetts Charitable Eye and Ear Infirmary, the drug received strong indorsement. Ordinarily it is employed in 10 to 20 per cent, the 10-per-cent strength being preferable, and is dropped freely and frequently into the conjunctival sac. Some surgeons apply stronger solutions directly to the everted lids; usually this is unnecessary.

The drug thus used is warmly commended as greatly preferable, and indeed superior, to nitrate of silver by many clinicians, notably by Standish in this country, by Darier in France, and by Pfalz in Germany, and their recommendations are based upon large experience and comparative studies. That it is an active bactericidal agent, although not as potent as nitrate of silver, and that it is far less irritating, although not without irritating qualities, than the latter drug, is well known; but that, in spite of these good qualities, it is often inefficient, uncertain, is sometimes badly borne, and is prone to cause permanent staining of the conjunctiva is equally well known, and many surgeons of large experience have abandoned its use in favor of nitrate of silver or other methods of combating gonococcic conjunctivitis.

Naturally, each physician must ultimately be governed by his own experience and results, and after a faithful trial of the drug and following all directions of its advocates I have been unable to persuade myself that protargol has a single advantage over nitrate of silver in the treatment of gonorrheal conjunctivitis of adults, and more than this it is, in my experience, not nearly so certain in its action, and I have ceased to employ it in this disease.

About six years ago two well-known pharmaceutical chemists of this city developed another silver compound, known as argyrol, which was at once received with favor, and which has been widely used in the treatment of all forms of purulent conjunctivitis. It has been particularly recommended in England by Stephenson and Hinshelwood, in France by Darier, and in this country by Myles Standish, Henry D. Bruns, and many other surgeons. I have used the drug very freely during the last five years, and was at one time very much impressed with its value, and particularly with its entirely bland and unirritating qualities. Little by little, however, it became apparent that it was inefficient in certain cases of the character which are now under discussion, and I was obliged to return to the other methods which have been previously described, although I continued to use it in others. The same experience was shared by a number of my colleagues, particularly those in the Philadelphia General Hospital, as well as by many surgeons in other cities and countries. We became convinced that either the preparation had altered in its qualities, or that we had had a fortunate series of cases at first and were deceived in regard to the specific value of its universal application in this disease, although not in regard to a certain value, presently to be described.

The reason for its failure is made evident in a notable contribution by Dr. George S. Derby, of Boston, who studied the bactericidal properties of this and various silver preparations. He found, in the first place, that although the manufacturers claim that it does not precipitate with albumin or with urine, and that it is an efficient bactericide, a precipitate is obtained in the presence of albumin and of urine, and that its bactericidal power is exceedingly weak. Thus, in a large series of observations a growth of the staphylococcus pyogenes aureus was obtained after exposure to 10-per-cent, 25-per-cent, and 50-per-cent solutions of this drug for one hour. Its action was always uncertain. While occasionally the germs were noted after a twenty-minute exposure, more often the cultures taken at the end of one hour showed a growth when examined twenty-four hours later. The age of the solution did not appear to be of importance. Dr. Derby's conclusions have in all respects been confirmed by C. R. Marshall and E. F. M. Neave in England in their research on the bactericidal action of compounds of silver. They found that argyrol, and also collargol, possess practically no bactericidal action whatever, and, moreover, that the percentage of silver which these compounds contain is no criterion of their bactericidal power; for example, collargol has a percentage of 86.6 of silver, while argyrol has a percentage of 20. Therefore any good effects, as they point out, which many clinicians maintain that they have obtained with argyrol cannot be attributed to any action which it has upon bacteria, inasmuch as such action is practically *nil*.

Standish, on the other hand, perfectly familiar with these bacteriological investigations, believes that the drug must have greater bactericidal qualities in the disease which we are discussing than the laboratory experiments upon other microörganisms would lead us to expect, and practically the same conclusions are reached by Darier.

Now a word in regard to the proper method of using argyrol: First, as the pharmaceutical chemists who have introduced the preparation properly insist, it must be freshly prepared; secondly, the conjunctival cul-de-sac should be kept flooded with it. Standish recommends the free instillation of a 25-per-cent solution every two or three hours, but I believe that what Henry D. Bruns calls the "immersion method," and which is the one that I myself have always employed, is still better, namely, that the instillations should be as

frequent as may be necessary to keep the conjunctival surfaces constantly bathed in the solution, which may be readily carried out because it is perfectly bland and unirritating. But I am also satisfied that by itself it is not sufficient, and I would neither advise you nor permit myself to treat a case of active gonococcic conjunctivitis in an adult with this drug alone, but would either use it in association with nitrate of silver, in the manner which I shall presently describe, or omit it altogether, and trust to the nitrate of silver treatment.

In Standish's most recent communication on this subject he records fifty-two cases of gonorrheal ophthalmia in adults which entered the infirmary connected with the Massachusetts Eye and Ear Hospital with clear corneas, which were treated with argyrol, with subsequent corneal infection in twenty-two cases, or 44 per cent +. In only four of these cases, however, was there total leucoma, or loss of the eye, giving as a result 58 per cent with recovery, or only approximately 7½ per cent in which the outcome was a blind eye.

Recently Dr. T. B. Holloway has investigated in a most painstaking manner the cases of gonorrheal conjunctivitis which have been admitted to the Philadelphia General Hospital during the last six years. Among the adult cases there were 106 eyes, 64 of which entered with clear corneas. It is interesting to compare the results in so far as nitrate of silver and argyrol are concerned. Nitrate of silver was used in 31 eyes, with corneal involvement in 8, or 25.8 per cent; while argyrol was used in 20 eyes, with corneal involvement in 4, or 20 per cent. It will thus be seen that comparing these two drugs, although the number of eyes treated with nitrate of silver was greater than the number of those treated with argyrol, there is a slight advantage, in so far as corneal involvement is concerned, in favor of the latter drug. But comparing these statistics with those furnished by the Massachusetts Eye and Ear Infirmary, in which, with a greater number of cases treated with argyrol, there was a subsequent corneal infection in 22 of them, or in 44 per cent, almost double the number of corneal involvements which, to be sure in a smaller number of eyes, we secured in the Philadelphia General Hospital with nitrate of silver.

But, gentlemen, statistics are not entirely trustworthy to establish the value of any single remedy. One must stand over each case and observe the progress of the disease from day to day, and because I have watched a large number, not only of the 64 eyes which entered with clear corneas, but of the 106 eyes which compose the total number of gonorrheal ophthalmias in adults which we have treated in the last six years in the Philadelphia General Hospital, in which 42 already had corneal involvement when they entered, and because in a large number of these cases we have failed to control the activity of the process with argyrol and were obliged to return to nitrate of silver, I am satisfied that the drug is not to be trusted in any sense as a specific in this infection.

You will naturally say, how then do you account for its enthusiastic indorsement by clinicians of large experience, whose results you have already quoted to us? It seems to me that Derby has answered this question in a satisfactory manner. He says: "Argyrol appears to be an almost inert solution. It is sterile and soothing; it mechanically washes away the pus; it certainly does not harm and does not deter nature from doing her best." He then adds: "Would not normal salt solution be as efficient and less objectionable?" Physiological salt solution would not act as well for the simple reason that it does not do one thing which in my judgment is the chief value of this drug, namely, as Standish has well shown, its power of diffusing itself, of penetrating all of the crevices of the inflamed folds of the conjunctiva, which it coats, and of floating the pus and mucus to the surface, from which it can be readily removed by a mild irrigation, or even by an ordinary wiping of the lips of the palpebral fissure. Nurses of experience in the care of cases of gonorrheal conjunctivitis declare that they have been much more easily managed since the introduction of argyrol, and for this reason alone: they

have been able, provided the drug is used according to the immersion plan already described, with much greater ease than formerly to keep the conjunctival sac freed from purulent secretion, but they will also testify that in so far as the Philadelphia General Hospital is concerned the drug is not competent to check the disease, and that something in addition to the argyrol must be used. I cannot, therefore, recommend it to you by itself as either a certain or safe remedy in this disease, although I indicate a certain use to which it should be put.

Now a word in regard to the method according to which I believe these cases should be treated. Other things being equal, iced compresses during the first thirty-six hours; frequent mild irrigations with a saturated solution of boric acid, great care being exercised that no bruising or scratching of the cornea shall take place, the elimination of the pus being materially aided by keeping the conjunctival sac constantly floated in a 25-per-cent solution of argyrol, which, in the manner already described, materially aids in bringing to the surface from the hidden folds of the swollen conjunctiva the purulent secretion; finally, the careful application, at least once a day, of a 2-per-cent solution of nitrate of silver in the manner and with all of the cautions which I have already described. In a certain number of cases even this treatment is not sufficient, and then solutions of permanganate of potassium seem to be efficacious. Always, if there is a swollen ring of chemotic conjunctiva surrounding the cornea, this should be deeply and thoroughly scarified.

In concluding this lecture I have to say only a few words in regard to ophthalmia neonatorum, in which disease the prognosis is not nearly so unfavorable as in gonorrheal conjunctivitis of adults, provided the patient is seen early. It is rarely necessary to use cold, although occasionally, during the first twenty-four hours of the case, intermittent applications of cold compresses are required. Many surgeons believe that in the treatment of conjunctivitis neonatorum argyrol usually achieves better results than nitrate of silver, not because the physiological action of the drug, its penetrating powers, or its bactericidal properties are more efficient in controlling the disease than those of nitrate of silver, but because it is more easily applied and is less irritating, and hence in inexperienced hands a safer remedy. It should be distinctly stated, however, that in a certain number of cases argyrol, and also the protargol, will not be sufficient, and nitrate of silver must be used, especially as Bruns recommends and as I have already described to you when speaking of gonococcic conjunctivitis, in addition to and after the use of the former remedy. Not only in babies with gonorrheal conjunctivitis, but in adults, the greatest care must be exercised to maintain the nutrition of the patients, and it must be the experience of every one who sees large numbers of these cases that if for any reason there is alteration or depreciation of nutrition, or an intercurrent illness, an eye that has been progressing most favorably will suddenly take on an equally most unfavorable turn.

In the Philadelphia General Hospital, during the same period previously quoted, 109 eyes affected with conjunctivitis neonatorum were treated, 95 of which entered the hospital with clear corneas.[1] Nitrate of silver was used in 50, with corneal involvement in 6, or 12 per cent; while argyrol was used in 14, with corneal involvement in 1, or a little over 7 per cent. Standish reports 201 cases of ophthalmia neonatorum treated with argyrol, with subsequent corneal infection in only 4 cases, or 2 per cent, a result which, he believes, constitutes a strong argument in favor of argyrol.

The treatment of this disease should be as follows: Painstaking but gentle irrigations in the ordinary manner, and not with the aid of any of the most unnecessary special devices for introducing the fluid beneath the lids; rarely, and only in cases with much swollen lids and of robust nature, cold compresses for the first twenty-four hours; constant flooding of the con-

[1] In many of these cases the general nutrition was very bad.

junctival sac with a 25-per-cent solution of argyrol, which acts as a protective and which floats to the surface of the purulent material, rendering its removal more easy; most assiduous watching of the case and adding to the treatment always (and this is necessary in many of the cases) a daily application of nitrate of silver in the manner already described, provided the symptoms do not promptly subside under the argyrol treatment or any other measures which may be employed.

At the risk of repetition I would conclude by saying to you that in gonococcic conjunctivitis of adults neither protargol nor argyrol is a safe remedy when used by itself; that in so far as my own experience is concerned, protargol may as well be abandoned; that argyrol is useful because it is bland and unirritating and helps to remove the pus, but that it has no control over the specific nature of the disease; and that, thus far at least, there is no better remedy in our hands than properly applied solutions of nitrate of silver, which doubtless are more efficient than they were in the past because we have been able to use argyrol and similar silver compounds as adjuvants. Many cases of ophthalmia neonatorum are better treated with argyrol for the simple reason that it can do no harm; it acts as well as, and better than, most of the non-specific remedies. Nitrate of silver may do harm unless it is applied by a skilled hand, but its proper application is required in a certain percentage of our cases. At some future lecture I will take up the complications of this disease, particularly those cases in which either before treatment has begun, or in spite of treatment, there has been corneal involvement; and I will say now that to your treatment of the gonococcic conjunctivitis of adults atropine drops should be used in order to keep the pupil dilated from the very start and to lessen the tendency to hyperemia of the uveal tract. Internally, the patients should have opiates, if required, and supporting measures if they are depressed and anemic.

THE DIAGNOSIS AND TREATMENT OF MULTIPLE NEURITIS.[1]

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Diagnosis.—The development of a multiple neuritis may be gradual or rapid. It may or may not be attended by fever. It may involve the nerves of both legs, of both arms, of all four extremities, of the trunk, and of the head and face. At times the motor fibers of the nerves are especially attacked, and in such cases paralysis is the most prominent symptom. Sometimes the sensory fibers are especially attacked, and in such cases pain is the most prominent symptom. At other times, again, both motor and sensory fibers are attacked, and in such cases both paralysis and pain are present. All varieties of mixed motor and sensory involvement may be found: thus motor and sensory phenomena may exist in about equal proportion, or motor phenomena on the one hand or sensory phenomena on the other may predominate to a small or to a great degree. In a given case the same relative admixture of motor and sensory symptoms holds good, other things equal, for all of the parts involved. The motor disturbance, instead of consisting of muscular paralysis or weakness, may consist of incoördination, and this symptom may resemble that observed in tabes.

Multiple neuritis may be widely diffused or may be comparatively limited in extent. Usually corresponding or homologous parts are involved, the involvement being symmetrical, but this is not always the case. To the motor and sensory phenomena above detailed various sensory disturbances, such as numbness, paresthesia, tingling, prick-

[1]Read before the Philadelphia County Medical Society, Nov. 14, 1906.

ing, hyperesthesia, hypesthesia, or anesthesia, may be added; and also various trophic disturbances, such as atrophy of muscles, changes of electrical reaction, contractures, glossiness of the skin, lividity of the skin, edema, local sweating, arrest of growth in the nails, rarely ulceration. The tendon reflexes are usually lost early. The skin reflexes may persist, may be exaggerated, or may be lost.

Undoubted spinal symptoms are in pure cases absent; this is especially true of involvement of the sphincters. It is a fact of prime importance in the diagnosis of multiple neuritis that the sphincters are intact. Cerebral symptoms on the other hand are not infrequently present and manifest themselves as mental confusion; the symptom group being at present often designated as Korsakoff's psychosis.

The most common history of multiple neuritis is as follows: The attack begins slowly and without fever. The nerves of the lower extremities are attacked by preference. The first symptoms noted are usually paresthesias, such as tingling, pricking, numbness in the legs and feet; then often after several days there come on spontaneous pains which may be of a character suggesting rheumatism, or may be sharp, stinging, or darting. The cutaneous sensibility becomes diminished, and after a lapse of a variable period of time, days or weeks, a diminution of muscular power in the legs and arms is noted. Pain becomes more pronounced and the weakness slowly progresses; soon walking becomes difficult. This paralysis does not affect the different muscular groups equally. The muscles of the anterolateral aspects of the legs are ordinarily the first and most severely attacked; the patient is unable to flex or properly flex the feet, or to extend the toes. The patient in walking raises his feet as though he were ascending a stairway, and the gait is known as the "steppage gait." In typical cases the weakness becomes so pronounced as to produce foot-drop. Pains and other sensory disturbances as a rule are also noted in the forearms, wrists, and hands, and in typical cases weakness of the extensors at the back of the forearms makes its appearance, which when pronounced gives rise to wrist-drop. Involvement similar in character may be noted in the muscles of the thighs and in the muscles of the upper arms, though this involvement is much less pronounced than that noted in the distal portions of the extremities; it is as a rule but slightly marked in the thighs, and still less so in the upper arm.

The muscle masses and the nerve trunks are painful to pressure. This symptom is of great value. Frequently it is not the large nerve trunks that are painful, but the smaller branches; at least pain and tenderness are usually most pronounced in the latter. A ready method for testing for the presence of such tenderness—and especially valuable in cases in which the sensory symptoms are but slightly pronounced—consists in grasping the leg just above the ankle or the forearm just above the wrist. If any degree of sensory neuritis be present in a given case, pain is readily elicited by this test, even if the pressure exercised be moderate.

If paralysis becomes well established the muscles may in course of time present the reaction of degeneration and may also undergo some atrophy. The tendon reflexes are diminished or abolished. Hypesthesia or anesthesia is common in the distal portions of the extremities. Sometimes hypesthesia is noted only on the sole of the foot, while painful hyperesthesia may be noted elsewhere. Psychic symptoms, and at times also ocular palsies, may be added.

The affection may persist without change for some months, when as a rule the disturbances of sensibility gradually become less marked and finally disappear. The motor functions also are reëstablished little by little, and the limbs recover their usefulness unless grave contractures have supervened. While the tendency is to recovery in the majority of cases, we should bear in mind that the involvement of certain nerves, such as the phrenic and pneumogastric, may at any time interrupt the

progress and entail fatal consequences. However, this result is very rare.

The above sketch of symptoms of an average case with mixed motor and sensory involvement, such as may ensue from alcohol, suggests the query whether the symptoms in a given case will enable us to diagnosticate not only the presence of a multiple neuritis, but also to determine its probable origin. To this query we are compelled to return a negative answer, for the same poison may give rise to the different clinical forms of multiple neuritis; this is, for instance, true of alcohol. Thus the latter, while commonly producing palsies, may give rise to a pure or almost pure sensory form, in which pain and other sensory symptoms greatly predominate or alone are present, together with preservation of the tendon reflexes. Roughly speaking, the facts may be summarized as follows: Alcohol usually gives rise to a neuritis both motor and sensory, beginning in the distal portions of the lower extremities; lead gives rise to a motor neuritis, involving especially the distal portions of the upper extremities; arsenic to a neuritis both motor and sensory, usually beginning in the distal portions of the upper extremities, but also involving the lower; rheumatism to a diffused neuritis both sensory and motor; gout to an irregular neuritis which is especially sensory. A similar statement may be made in regard to diabetes. The various infectious diseases give rise to widely diffused neurites, both motor and sensory; these may be met with in the postfebrile period of typhoid fever and of other exanthemata, such as measles. Influenza may give rise to neuritis widely diffused and largely sensory; diphtheria to a motor neuritis characterized, as is well known, by an involvement of the soft palate, at other times by a widely diffused involvement giving rise to diphtheric ataxia; septicemia may give rise to a neuritis widely diffused or more or less localized according to the special etiology, and which is both motor and sensory. Tuberculous neuritis, which is rare, is sensory in type. Finally, malarial neuritis, which is also very rare, involves the legs most frequently.

Widely diffused or generalized forms of multiple neuritis usually present a predominance of motor phenomena. They may ensue in the decline or period of convalescence of an infectious disease, such as typhoid fever or diphtheria, as just stated. Their course is subacute. They begin by a rapidly increasing weakness in the distal portions of the lower extremities; after a few days this weakness is pronounced, or paralysis may be complete. The tendon reflexes are abolished. The paralysis invades the thighs, and usually after an interval also attacks the upper extremities, again beginning in the distal portions, the hands and wrists first, and spreading toward the trunk. Next the paralysis may involve the trunk—the abdomen, the thorax, the diaphragm; later the cranial nerves—the nerves of the medulla, the facial, the motor nerves of the eyes, the hypoglossal. Involvement of the pneumogastric may also, of course, occur. Spontaneous pain in nerve trunks is usually absent—at least it is not a marked feature; numbness and formication may be the only sensory symptoms complained of. The nerve trunks and muscles are usually painful to pressure, though even this symptom may be absent, as in the multiple neuritis following diphtheria.

Instead of the onset being subacute, multiple neuritis may come on suddenly, develop rapidly, and may be accompanied by a febrile rise. It may come on in a person previously well and without apparent cause. Such causes as exposure to cold, overwork, digestive disturbances, have been thought to play a rôle; at other times, as in cases of a less acute course, the symptoms have appeared after typhoid fever and other exanthemata, and also after alcoholic and arsenical intoxications. The attack may be ushered in by general malaise, chills, nausea or vomiting, diarrhea, fever, headache, backache, nervousness, depression, and sleeplessness. Paresthesias and numbness usually make their appearance in the extremities, and after one or more days pain

appears in nerve trunks and muscles. Little by little, but progressing rapidly, paralysis is established, the paralysis beginning, as usual, in the distal portions of the lower extremities, rapidly invading the upper extremities and the trunk. The clinical picture presented may resemble Landry's paralysis; indeed, the resemblance may be so close as to make a differentiation difficult or almost impossible. However, the fact that in true Landry's palsy the paralysis begins in the distal portions of the lower extremities and invades the trunk before it invades the arms is a point of considerable value. In multiple neuritis of the form here described the paralysis begins as a rule in the legs and then invades the arms. Sometimes involvement is simultaneous in both legs and arms. Involvement of the trunk subsequent to the arms would negative true ascending spinal paralysis. In the acute or febrile form of neuritis the more important cranial nerves most frequently escape; however, facial and oculomotor involvements may occur. The fever is as a rule of short duration. The patient usually survives the attack, and then muscular atrophy sets in. In this form the atrophy is rapid, diffuse, and irregularly distributed.

If we were asked to briefly summarize the symptoms of multiple neuritis, we might say that, as far as the motor symptoms are concerned, it is characterized by a flaccid paralysis, progressive in character, but with a decreasing intensity, symmetrical in distribution, beginning and most pronounced in the distal portions of the extremities, and spreading toward the trunk; the extensors of the toes and flexors of the foot on the one hand and the extensors of the hand and wrist on the other being most involved, giving rise to the familiar foot- and wrist-drop. As far as the sensory symptoms are concerned, these consist of spontaneous pain and other sensory disturbances, hyperesthesia and the like, and of pain on pressure in nerves and muscles. Finally, as already pointed out, both sensory and motor symptoms may be present in equal degree; sensory symptoms may predominate or alone be present; and finally motor symptoms may predominate or in turn may alone be present.

The diagnosis of multiple neuritis would seem to present little difficulty, and in ordinary practice this is the case. The peculiar character of the palsy, the involvement of the distal portions of the extremities both in pain and motion, leave no doubt as to the diagnosis. In the average case the diagnosis is easy; objective symptoms and disturbances of sensibility characterize the onset. Later there supervenes the paralysis which attacks first the distal portions of the extremities and diminishes in general from the periphery toward the trunk, the palsy always being flaccid. Finally, sooner or later there appear the trophic troubles of the muscles and the skin above described. The tendon reflexes are almost always abolished. The cutaneous reflexes may be exaggerated. The sphincters are not involved. No matter how widely multiple neuritis may be diffused, the association and succession of these symptoms suffice to make a diagnosis.

While in typical cases the diagnosis can be readily made, cases are by no means infrequent in which great difficulty may be encountered. Thus, certain cases of multiple neuritis, in which the involvement of the sensory nerve fibers predominates, as is so often the case, especially in alcoholic intoxication, may suggest at first sight tabes. The lower extremities may be the seat of sharp or darting pains, and there may be various areas of anesthesia or hypesthesia, *e.g.* plantar anesthesia. The knee-jerks are abolished, and when the patient closes his eyes the station and gait become distinctly uncertain. However, the more or less marked paralysis and atrophy of the extensors of the feet usually bring about the steppage gait. The steppage gait has nothing in common with the incoördinate gait of tabes, in which, as is well known, the patient raises his feet excessively and then brings them down forcibly upon the heels. Furthermore, in multiple neuritis,

pupilary, vesical, and genital symptoms are absent, as is also atrophy of the optic nerve. Notwithstanding, there are cases of multiple neuritis in which the sensory symptoms are almost exclusively present or in which the motor palsies are so slight that a tabes is closely simulated. Thus a multiple neuritis may begin by pains, darting in character. There may be analgesia or anesthesia of the feet and lower portion of the legs, together with abolition of the tendon reflexes. The muscular sense also may be blunted. The station may be greatly impaired, and a Romberg sign may be present. Further, especially in cases in which there is plantar anesthesia, the gait may become quite ataxic, the movements of the legs being badly coördinated, and the patient may require the constant assistance of his eyes in walking, just as in tabes. In some cases the ataxia of movement may involve also the upper extremities. The possibility of confusing multiple neuritis with true tabes is increased by the fact that in tabes itself peripheral neurites are frequent and play an important part in the causation of various motor and sensory symptoms—*i.e.*, a peripheral neurotabes may in true tabes play, as is well known, a leading rôle. We should, in doubtful cases, endeavor to establish the diagnosis of a multiple neuritis by the following features: first by the rapid development of the symptoms—at most a few weeks instead of years, as in tabes; by the absence of the Argyll-Robertson sign, by the absence of all sphincter troubles, by pain on pressure over the nerves and over the muscles, by the distribution of the sensory disturbances which are accentuated in the distal portions of the extremities and diminish progressively as the trunk is approached.

Every now and then a multiple neuritis which is diffuse and rapid in onset may strongly suggest an affection of the cord. This is especially apt to be the case when the neuritis is purely or almost purely motor. Under such circumstances a poliomyelitis may be closely simulated, so much so that the differential diagnosis may be a problem of extreme difficulty. The difficulty is further increased by the fact that both multiple neuritis and poliomyelitis may arise under similar etiological conditions, both may be acute in onset, and both may be accompanied by a febrile rise. However, there are important differences in the method of invasion which, if the case can be observed or if a clear history can be obtained, may enable a differential diagnosis to be made. Multiple neuritis begins usually in the distal portions of the lower extremities, and soon attacks the distal portions of the upper extremities; the proximal portions of the extremities are always attacked later, and this is true also of muscles of the trunk. Poliomyelitis on the other hand attacks at once both upper, both lower, or all four extremities, and the paralysis is accentuated in the portions of the limbs nearest the trunk. Sensory troubles are usually not noted; at least they do not play any but a mere subsidiary and transitory rôle, and neither the nerves nor the muscles are sensitive to pressure. In multiple neuritis again the onset is rarely as sudden and the paralysis extends more slowly. It predominates, as just stated, in the distal portions of the extremities and grows less toward the trunk, and involves the inferior extremities more than the upper. Finally, in poliomyelitis, the involvement of the muscles may be, and frequently is, decidedly irregular and asymmetrical, thus presenting a picture differing decidedly from the symmetrical palsies observed in multiple neuritis. When fibrillary contractions are observed, they argue in favor of poliomyelitis as they are very rare in multiple neuritis. Again, disturbances of the secretions of the skin and trophic disturbances of the skin argue in favor of a multiple neuritis. However, there are certain cases which from the very nature of the facts must remain in doubt; but after all it matters little if the motor neuron in the anterior cornu be attacked or its peripheral prolongation in the nerve, as far as the essential character of the symptoms is concerned; and lastly, it is extremely probable that sometimes both

nerve cell and nerve fiber are involved together.

At times a general myelitis is simulated; here, however, the involvement of the sphincters in myelitis and the preservation of the knee-jerk, as well as the absence of pain upon pressure in the nerves and muscles, serve as factors of differential value. It must be remembered, however, that some cases of multiple neuritis are incontinent because of the mental condition, the patient being deeply confused or even stuporous. Soiling of the bed, therefore, does not of itself enable us to predicate paralysis of the sphincters. Again, the knee-jerks may not be immediately lost in multiple neuritis. Finally, it is a well-admitted fact that changes in the cord may exist at the same time as changes in the peripheral nerves, and that it is perfectly possible to have in one and the same patient a certain degree of myelitis and a certain degree of neuritis. It must be admitted, however, that the combination is clinically infrequent.

A differentiation from Landry's palsy is often a matter of extreme difficulty, and in many cases the diagnosis must remain in doubt. Landry's palsy begins in the distal portions of the lower extremities, spreads rapidly to the thighs, the trunk, the upper extremities, the neck, the muscles of the face, of the larynx, and of the pharynx; no sensory involvement, no sphincter involvement, abolition of the tendon reflexes, no atrophy of muscles; death after a few days or a few weeks. In multiple neuritis, as already stated, the distal portions of the legs are involved first, then the distal portions of the arms, later only the trunk. Further, atrophy is common in multiple neuritis. Finally, in Landry's palsy, death is the most frequent outcome; in multiple neuritis it is recovery. Important as is the differential diagnosis, the task is made still more difficult by the fact that in Landry's palsy there is not rarely an actual involvement of the peripheral nerves.

Treatment.—In all forms of multiple neuritis, whatever the origin, absolute rest in bed is imperative. In most cases, indeed, the loss of power in the limbs is so pronounced that the patient is already in bed when the physician arrives. In other cases the patient, not knowing the seriousness of his condition, may remain up and around unless advised to the contrary. Absolute rest in bed, let us repeat, is imperative. The limbs should be so placed as to be neither excessively flexed nor unduly extended, and should be supported upon soft pillows, or better still, if they be very painful, upon cotton-batting kept in position by flannel bandages or by splints. In other cases flannel bandages alone, if not too firmly applied, give considerable comfort. As a rule attention to the position and proper support of the limbs is of itself sufficient to greatly relieve the pain. At times, however, it is imperative to make use of the coal-tar analgesics or even of morphia. Not infrequently a combination of morphia and phenacetin yields an excellent result. For reasons which are of course evident, these drugs should be used for a short time only and as sparingly as possible.

The pain having been brought under control, the cause of the attack should be sought for. If the latter be clearly toxic—*e.g.*, alcoholic in origin—the removal of the cause constitutes the next step in treatment. In cases of alcoholic multiple neuritis, which is the most common form, the alcohol should of course be withdrawn immediately.

If a diathetic cause seems probable, such as rheumatism, appropriate treatment should be adopted. In most cases, indeed, it is well to begin the treatment by the free administration of diaphoretics, such as neutral mixture. By this means the elimination of such alcohol as is still present in the economy, or of uric acid or other toxic substances, is greatly favored. The free ingestion of liquids also favors free diuresis, and the advantages of this need hardly be dwelt upon. When the initial stage has subsided it is advantageous to make free use of salicylic acid and its compounds. Independently of their beneficial action in cases of

neuritis due to cold—that is, "rheumatic" neuritis—they are indisputably of benefit in other forms. The drug should be administered in such a way as to be least irritable to the stomach. In alcoholic patients this point is of paramount importance. Neutral solutions of ammonium salicylate, especially if the solution is absolutely neutral, are as a rule better borne than sodium salicylate, but no matter which drug be employed it should be given largely diluted, and if possible after the taking of food. Aspirin is of undoubted value and is applicable to a larger number of cases than either sodium salicylate or ammonium salicylate. It should be given in from five to fifteen grains every four hours. In some cases it will disagree with the stomach, and then recourse should be had to salophen, which should be given in similar doses. Though very bland and always agreeing with the stomach, salophen is less efficient than aspirin.

A treatment such as this should be persisted in for a more or less prolonged period —for several days, and even, with proper precautions, for a week or two. Because of the great weakness attending the usual attack of multiple neuritis the heart should be carefully watched, and, especially during the administration of the salicylate remedies, it is often wise to give digitalis, preferably in the form now dispensed as digitalone. After the salicylates are discontinued, lycetol or piperazin should be freely given, preferably lycetol in fifteen-grain doses daily, dissolved in large quantities of water.

In cases of average severity, more or less marked symptoms of weakness in the extremities, pain, and hyperesthesia persist, in spite of active treatment, for weeks and sometimes months. In other words, the average case passes into a subacute or chronic stage. At this period it is useless to longer administer the salicylates or piperazin. Advantage is now found to result from the administration of moderate doses of mercuric chloride, 1/30 of a grain, or of potassium iodide, from 5 to 15 grains three times daily, or of both of these drugs together. I have had an especially favorable experience with long-continued administration of small doses of the mercurial.

As might be expected, the patient suffers more or less marked loss of weight during this prolonged illness and often becomes very anemic. To combat these conditions, iron, especially in the form of the tincture of the chloride, cod-liver oil, malt, and other nutrients are indicated. As time passes the tincture of ferric chloride should be replaced by milder chalybeates, such as Blaud's pill or iron and manganese peptonates. Strychnine and arsenic in small doses may also be employed under these conditions, although their value is open to some question.

During the entire course of treatment the principles of the "rest-cure" should, so far as possible, be applied—that is, full feeding should be resorted to, milk and eggs being added to the diet in large and increasing quantities; and as the pain and hyperesthesia subside, massage should be employed. Later on, when nothing but muscular weakness remains, electricity should be used. The slowly interrupted faradic current is indicated in most cases, and the extensor muscles should receive especial attention.

In many cases there is, in addition to the residual weakness, more or less marked contracture of the limbs. This can as a rule be overcome by passive movements and massage, provided these measures be persisted in for a sufficiently long period. It is important also in certain cases, when the patient begins to exercise, to correct foot-drop, when persistent, by a leather or rubber muscle or by other orthopedic device. It is remarkable how great a degree of improvement it is possible to obtain in even very bad cases; indeed, a complete cure is by no means infrequent when the outlook is at first and for a time persistently discouraging.

CHOLEMIA IN NEURASTHENIA.

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The toxicity of bilirubin has not been the subject of much investigation. According to Bouchard, about two-thirds of the toxicity of bile is due to this cause, pointing to the possibility of a bilirubinemia producing definite symptoms such as are found in those diseases in which this condition exists. Further, there may be definite disease in which the primary pathological condition is the presence of an excess of bilirubin in the blood.

Bilirubin has the composition $C_{32}H_{36}N_4O_6$, behaving like an acid, forming soluble compounds with metals of the potassium group. The amount of bilirubin in bile from the gall-bladder is about 5 per cent, while in the bile from a fistula it is about 0.1 per cent. The formation of bilirubin in twenty-four hours, though variable, will probably never exceed 5.0 grammes under normal conditions. Bilirubin is almost certainly a decomposition product of hemoglobin, though the chemic constitution in the various stages of formation is not known. Croftan has produced bilirubin by the action of trypsin on hemoglobin in the presence of glycogen or glucose. Bilirubin is produced by nascent hydrogen, also probably by bacteria in the intestine into hydrobilirubin, which is further reduced to stercobilin, in which form it is eliminated with the feces. A certain proportion of the hydrobilirubin is absorbed from the intestine and eliminated from the kidneys, with further reduction to urobilin. Our present knowledge of these processes is very limited, but that urobilin is derived from bilirubin is almost certain.

The toxicity of bilirubin has not yet been proved by experiments on animals. Bouchard states that 6.0 Cc. of bile per kilogramme of animal causes death in convulsions, and that if the bile is filtered through animal charcoal, removing the coloring matter, its toxicity is reduced two-thirds. This reduction in toxicity cannot be caused by the absence of bilirubin, as injections of pure bilirubin have in the experiments of R. Plaesterer produced little or no toxic effect. David Rywosch obtained slight disturbances immediately after the injection, the animals recovering in a few hours. The conditions existing in cholemia are very different from those produced by the injection of the pure substance in healthy animals; in the latter condition the bilirubin is partially reduced to hydrobilirubin and eliminated by the kidneys, but principally it is precipitated into the tissues, and thus withdrawn from the circulation. In order to produce the toxic effects of cholemia it would be necessary to inject daily or more often a certain amount of bilirubin until the tissues become discolored and failed to absorb a further quantity.

Rene Frison has shown that injections of bilirubin produce a hyperexcitability of the muscles to electric stimulation which is antagonistic to the action of the bile salts, injections of the latter producing hypoexcitability to electric stimulation (small doses of the bile salts produce hyperexcitability). These experiments show that bilirubin is toxic, and that the failure of elimination with saturation of the tissues will produce a toxemia with hyperexcitability of the muscles, simulating the condition known as "nervousness."

The pathologic condition producing cholemia is due either to increased formation of bilirubin with failure of elimination, or to pathologic conditions in the liver causing the bilirubin to be absorbed instead of being eliminated with the bile into the intestine. Plugging of the bile capillaries, cirrhosis of the liver, and cellular insufficiency are probable causes. The pigmentation of the skin renders the diagnosis of cholemia very easy. The bile pigment

is usually absent from the urine, or is only occasionally present, or there may be an excess of urobilin.

The qualitative examination of the blood for bilirubin is not difficult; the finger of the patient is punctured, and about 2 Cc. or 3 Cc. of blood allowed to drop into a clean, dry cylinder, which is placed in a cool place for twenty-four hours without shaking and allowed to clot, the serum drawn off, and Gmelin's test applied. The albumin immediately clots from the action of the acid, but in a few minutes a slight blue ring appears just above the point of contact. Gmelin's reaction to bilirubin is positive in dilutions of 1 to 40,000; according to Hayem the reaction is positive in normal serum; if the serum is diluted with two-thirds normal salt solution and the reaction is positive, cholemia exists. The clinical symptoms of cholemia are sufficiently marked to render the laboratory examination unnecessary except for the purpose of confirmation.

The patients usually complain of nervousness, with a feeling of fatigue, inability to work, with a nervous irritability accompanied by a despondency which may be so great as to become a delusional melancholia. The patient also complains of a form of dyspepsia which he describes as "bad digestion," characterized by a feeling of heaviness in the stomach after eating, followed in an hour or two by thirst, with acid eructations; there may be pains in the region of the stomach immediately after eating, which cease after a few minutes, reappearing in three or four hours, and feeling as though they were moving toward the esophagus. There may also be sick stomach, but rarely any vomiting. The appetite remains normal, or may be capricious and exaggerated, rarely decreased, occasionally a true anorexia occurs. It must be borne in mind that a patient's account of what he eats is not reliable; the only way of finding out the condition of his appetite is to test the 24-hour urine for total nitrogen. Constipation is a marked symptom, often with occasional attacks of diarrhea without apparent cause, the stools being acid and burning, containing much bile, and perhaps blood and mucus; the diarrhea may commence with vomiting of bile. The stomach examination shows hyperchlorhydria with excess of organic acids, occasionally hypochlorhydria. The stomach contents are thick and viscid, there being a lack of fluid, and much very acid mucus. There is also excessive gas formation. Digestion appears to be rapid and complete.

The pulse is normal or slow, irregular and irritable; the mean blood-pressure is high in proportion to the maximum. There is a hyperacidity of the saliva, with a bitter taste in the mouth and a fetid breath. A common symptom is a reversal of temperature, the maximum being at 7 A.M., and the minimum, which may be slightly below normal, at 7 P.M.; there may also be subjective temperature, and rarely slight intermittent feverishness. Epistaxis is common, hematemesis rare, retinal hemorrhage may occur in old patients, purpura on the back of the hands is common, cerebral hemorrhage is not uncommon, menorrhagia is the rule.

The skin has a dirty, yellowish hue, generally termed "bilious complexion." The discoloration is most marked on the back of the hands and dorsum of the foot; the skin over the knuckles may be of a normal shade or nearly so, while the skin between the joints is pigmented, varying from a dirty yellow to a dark brown; spots may also occur on the palm of the hand, soles of the feet, on the tibia, on the face, and various parts of the body. The whole skin is discolored, with deeper coloration in patches in various parts.

The mental symptoms differ in each case and are of no value from a diagnostic standpoint. The prevailing condition is that of melancholia, a deep despondency, looking on the gloomy side of everything, exaggerating every trifle, a fear of some undefined danger, with a desire for death, which may, though rarely, cause suicide. "Hearing voices" is also common; the patient may jump from the window to get away from the persecution, but without suicidal intent. From the worry and de-

pression there is a loss of weight, insomnia, and headache, the latter being usually at the vertex or occiput. The mental symptoms develop slowly and insidiously, progressing to insanity.

Physical examination gives little information; the liver may be slightly decreased in size and the spleen enlarged, but these conditions are not constant. The etiology of the condition is not very clear; if it is conceded that bilirubin is only formed in the liver, then an imperfect elimination of bile must be the cause, and in a large number of cases this is undoubtedly the cause. The question whether bilirubin can be formed in other organs is not settled, though it is found in old blood-clots and in the pigmented areas of the skin. A certain number of cases appear to be congenital, due probably to the action of maternal toxins upon the liver of the fetus.

In the newly-born there is a physiologic cholemia, bilirubin or urobilin being found in large amounts in the plasma. Gilbert and Lereboullet have shown that under normal conditions the blood of the umbilical cord contains three times as much bilirubin as the maternal, and that the blood of the newly-born is a third richer in bile pigment than the blood in the cord; this physiologic fetal cholemia must produce a slight secondary cholemia in the mother. The urine of the newly-born contains no bilirubin under normal conditions, and its presence denotes a pathologic cholemic condition.

In most cases there is a history of chronic constipation antedating the dyspeptic symptoms; the toxemia from the constipation and from the organic acids formed in the stomach is probably the cause of the hepatic insufficiency, which affects the bile capillaries, preventing free elimination of the bile, forcing it into the lymphatics; a portion of the liver may only be affected. Boix, Welch, and Fridenwald have shown that the products of gastric fermentation produce cirrhosis of the liver; a slight angiocholitis from a weak infection may also be a cause. The glycosuric functions of the liver are usually normal, or nearly so.

Interstitial nephritis is often associated with this condition; the cholemia may be due to the incapacity of the kidney to eliminate the excess of bilirubin in the blood, but, what is more probable, the presence of an excess of bilirubin in the blood produces the kidney lesion. The excessive formation of bilirubin and the decreased destruction of erythrocytes are a cause of the pigmented skin in some cases of anemia, and especially in malaria and other infections, but in the cases under consideration there is no very marked anemia, though occasionally I have found methemoglobin.

In many cases Gmelin's test has been found to be positive in the cerebrospinal fluid, in which bilirubin is normally absent. As the cerebrospinal fluid is a special secretion from the ependyma of the ventricles, the vessels of the pia, and the choroid plexus, following the perineural sheaths, some escaping from the neural lymphatics, the largest portion finding its exit from the cranium into the longitudinal sinus, acting as a lymph for the nervous system, it is probable that should bilirubin obtain entrance into this special circulation nervous symptoms would result.

The cases of neurasthenia or insanity associated with, and in my opinion caused by, cholemia are difficult to treat. Mercury in small doses in combination with sodium glycocholate mass has a good effect upon the liver; at the same time the patient should drink large quantities of water containing the inorganic salts of the blood in their normal proportions, to which may be added high injections of artificial serum. The alkalies in full doses are also of benefit, as is also sodium salicylate.

The administration of hepatic stimulants is usually followed by marked physical improvement, the sodium glycocholate mass assisting to clear up the discoloration of the skin. The discoloration of the skin is a barometer for the condition, the shade deepening usually a day or two before a relapse. In a typical case at Mount Hope Retreat the patient became of a deep brown color a few days before a severe delusional attack occurred, and as the color of the skin improved so did the mental symptoms.

ACTION OF SEVERAL AGENTS UPON INTESTINAL PERISTALSIS, STRIPED MUSCLE, AND THE HEART.

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AND
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The intestinal movements were studied by the method of Magnus, of Heidelberg. Our experiments were made by taking a piece of the small intestine, about 10 centimeters in length, of a rabbit or cat. This was placed vertically in a glass containing 225 Cc. of a modified Ringer solution. One end of the intestine was connected by a hook to an L-shaped glass tube, and the other end was fastened by a thread to a hook on Porter's heart lever slightly weighted. The piece of intestine was entirely immersed in the solution, through which oxygen was constantly bubbling. The temperature of the Ringer solution was maintained at about 37° C. The cardiac lever registered the contractions of the longitudinal muscles of the intestine upon a smoked drum. Several contractions of the intestine were recorded for a few minutes before the agent to be used in the experiment was poured into the Ringer solution surrounding the intestine. The subsequent contractions of the intestine were studied as affected by the drug.

The heart of the frog with the sinus snipped was allowed to register for five minutes. Then the agents in tap-water saline were painted on the heart and the effects noted.

The gastrocnemius of the frog was removed and allowed to soak in tap-water saline with the agent added from ten to fifteen minutes. Then weak opening induction shocks were applied to it, and the curve was taken on a smoked drum.

The point observed in the muscle curve was whether any of these agents produced a prolongation of relaxation in the muscle curve, as has been noted after veratria and adrenalin. The height of the contraction was not studied, and when I speak of the effect or no effect on the muscle curve I refer only to the prolongation or no prolongation of the relaxation period.

Skatol (*Merck*).—When a half-grain of skatol was thrown into the Ringer solution the height of the peristaltic contraction

FIG. 1.—Effect of skatol on heart. First line normal. Subsequent lines show the effect of skatol locally applied to the heart.

was greatly increased for a short period. The tonus of the intestine was slightly increased and then decreased.

Skatol had no effect upon the curve of relaxation of muscle.

Skatol increases the frequency of the frog's heart, but reduces its force (Fig. 1).

Indol (*Merck*).—It lowers the tonus, but

does not affect the strength of the intestinal contractions. It lowers the force and frequency of the heart (Fig. 2).

The relaxation period of the muscle was not altered by it.

Neurin (*Merck*).—One-half drop of a 25-per-cent solution lowers the tonus and force of peristalsis.

It lowers the force and frequency of the frog's heart. The relaxation period of the muscle was not affected.

It did not prolong the relaxation of the muscle curve.

Butyric Acid (*Merck*).—One drop of a 25-per-cent solution increases the tonus and force of the intestine.

It slows the heart and arrests its diastole.

It causes no change in the relaxation period of the muscle.

Uric Acid (*Merck*).—Uric acid in two-gramme doses when added to the Ringer's solution increased the height of the intestinal contractions, but caused no change in the tonus (Fig. 3).

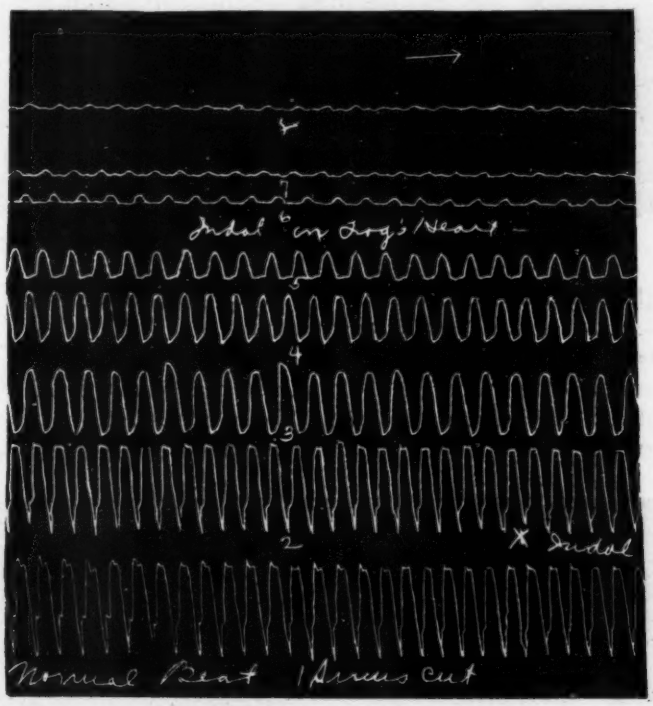

FIG. 2.—Effect of indol on frog's heart. First line normal. Subsequent lines show the effect of indol.

Cholin (*Merck*).—It temporarily stops the heart. Cholin has no effect upon the relaxation of the muscle curve.

Upon the intestine it primarily increases the force and tonus; then decreases the height of the intestinal contraction and the tonus.

Glycocholic Acid (*Merck*).—It did not alter the rate of the heart-beat, but lowered the height of the contraction.

It decreased the tonus and force of the peristaltic movement of the intestine.

Uric acid occasionally prolonged the relaxation of the striped muscle.

Uric acid reduced the force and frequency of the frog's heart.

Hippuric Acid (*Merck*).—Hippuric acid increased the tonus of the intestinal muscle, but had no effect on the height of the contraction.

Hippuric acid had no effect in prolonging the relaxation of the muscle curve.

Upon the heart hippuric acid did not alter the rate, but reduced the height of the contraction.

Xanthin (*Merck*).—It slowed the heart, momentarily stopping it (Fig. 4).

It altered the relaxation period of the muscle (Fig. 5).

Urea (*Merck*).—Urea causes slow relaxation of the muscle (Fig. 6).

Urea reduces the force of the heart, but does not alter its rate.

It very slightly increases the force of the intestinal contractions.

Abrin (*Merck*).—One one-hundredth of

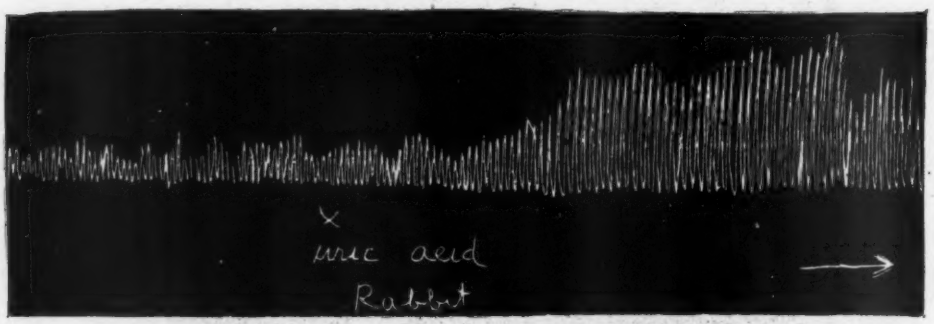

Fig. 3.—Effect of uric acid on intestinal movements.

It lowered the tonus, but increased considerably the force of intestinal contraction.

Hypoxanthin (*Merck*).—It reduces the height of the cardiac contractions.

It has no effect upon the relaxation of the muscle curve.

a drop increases the tonus and force of the intestine.

Abrin lowers the force of cardiac contraction and slows the rate very slightly.

It does not alter the relaxation period of the muscle.

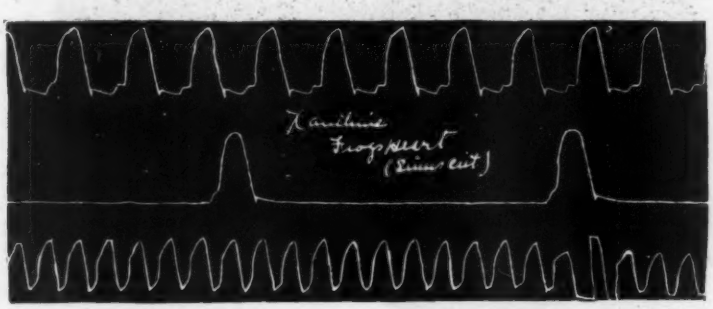

Fig. 4.—Effect of xanthin on the frog's heart. First line normal. Second line shows arrest. Third line shows the slowing action on the heart.

It reduces the tonus, but increases the force of the contraction of the intestine.

Guanin (*Merck*).—It lowers the tonus, and but slightly increases the force of peristalsis.

It has no effect upon the relaxation period of the muscle.

It has no marked effect upon the heart.

Iodothyrin (*Merck*).—Iodothyrin increases the tonus, but reduces the strength of intestinal contractions.

Iodothyrin reduces the force of cardiac contractions.

It has no effect upon the relaxation of the muscle.

Protonuclein (*Reed & Carnrick*).—Nu-

clein in large doses (8 grains) when added to Ringer's solution produced a temporary inhibition of the intestinal movements, followed by an increase in tonus and in the extent of the contraction.

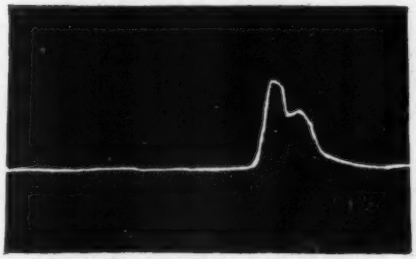

FIG. 5.—Effect of xanthin on the muscle curve of the gastrocnemius of the frog.

Protonuclein had no effect on the relaxation period of the muscle curve.

Protonuclein lowered the force and frequency of the frog's heart.

Spermin (*Poehl*).—Spermin increased the height of the peristaltic movement, but lowered the tonus.

Upon the heart-beat it lowered the

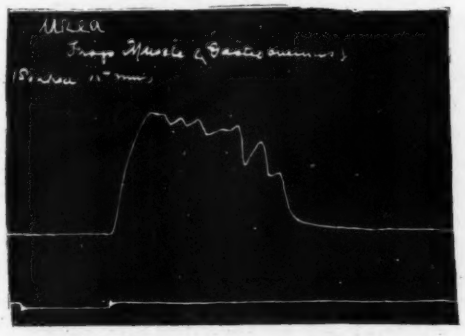

FIG. 6.—Effect of urea on muscle curve of frog's gastrocnemius. Weak opening induction shock.

height of the contraction, but did not alter its rate.

It had no effect upon the relaxation of the muscle curve.

Picrotoxin (*Merck*).—It reduced the tonus, but very slightly increased the force of peristalsis.

It greatly lowered the force of the cardiac contractions, but did not affect the frequency of the heart.

It did not alter the relaxation period of the muscle.

In a previous paper[1] we have shown that the albumoses, peptones, leucin, and tyrosin increase intestinal peristalsis. Roger[2] has confirmed the action of peptone. Of these agents, the albumoses seem to be the most powerful. The other agents found in the intestinal canal, as skatol, indol, neurin, cholin, and butyric acid, also increased peristaltic movements. Hence we can infer that nearly all the products of intestinal digestion and putrefaction have the power to coöperate in an evacuation of the intestinal contents. Of all these agents, albumoses are the most active. Hence a thorough digestion producing albumoses is essential in the unloading of the intestinal contents.

As to uric acid, hippuric acid, xanthin, hypoxanthin, guanin, and urea, all increased the activity of the intestinal movements. Abrin, protonuclein, and spermin increased the extent of the intestinal contractions.

These studies show that the intestinal unstriped fibers and ganglia are very sensitive to a great variety of agents, and whilst some only increase the tonus, others increase the height of contraction and the tonus. As to inhibitory agents of the intestinal canal, the chief one is adrenalin, and in man opium.

The agents which excite peristalsis greatly preponderate when compared with those inhibiting.

As to changes in the relaxation period of a muscle curve, xanthin, uric acid, and urea slow it. Urea and xanthin make the striated muscle more irritable.

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[1] *Journal of the American Medical Association*, 1905.

[2] *Journal de Physiologie et de Pathologie Generale*, 1906, No. 1.

A REVIEW OF THE OPSONINS AND BACTERIAL VACCINES.

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As requested by the GAZETTE, I shall attempt to describe as succinctly as possible the theory of the opsonins and the therapeutic results that have been obtained by the application of the new theory. As the years go by we realize more thoroughly the correctness of the prophetic belief of the "Immortal Pasteur," that the day would come when it would be possible to eradicate the infectious diseases by vaccination.

We are indebted to Metchnikoff for calling attention to and explaining the rôle of the white blood cells in the defense of the body against bacterial invasion, but the phenomenon of phagocytosis is not so simple as it at first appeared, as little by little new facts are developed which amplify our knowledge of the subject.

It was shown by Denys and Leclef, in 1895, that when rabbits were immunized against streptococcus pyogenes the serum acquired but slight bactericidal properties, but that such serum, when brought in contact with the leucocytes of normal or immunized rabbits, greatly enhanced their phagocytic activity. Conversely no acceleration of phagocytosis was observed when the corpuscles were brought in contact with the serum of a normal animal.

Mennes two years later confirmed this by showing that similar results were obtained from the blood serum of guinea-pigs treated with cultures or toxins of pneumococci.

A method of measuring the phagocytic activity of the leucocytes was developed by Leishman in 1902. In 1903 Wright and Douglas made an extensive study of the phagocytes, when brought in contact with suspensions of cultures of staphylococcus pyogenes, and were able to show:

1. Quoting from the original: "We have here conclusive proof that the blood fluids modify the bacteria in a manner which renders them a ready prey to the phagocytes. We may speak of this as an 'opsonic' effect (*opsono* (a Latin verb), I cater for; I prepare victuals for), and we may employ the term 'opsonins' to designate the elements in the blood fluids which produce this effect."

2. Normal blood serum and plasma possess the same opsonic action upon bacteria.

3. Serum loses its opsonic action when heated to 60° C. This is spoken of as inactivated serum.

4. Inactivated serum and physiological salt solution have the same influence upon phagocytosis.

5. "The opsonic power of the blood fluids disappears gradually on standing," losing about 50 per cent of its activity in five or six days.

6. An anti-opsonic effect is noted when blood serum is digested with typhoid bacilli.

7. When a condition of immunity is conferred upon patients infected by staphylococci, by vaccination with heated cultures of staphylococci, the opsonic action of the patient's blood serum is greatly augmented.

Neufeld and Rimpau (1904) found in antistreptococcic and pneumococcic sera evidence of substances which, while inactive toward leucocytes, possessed very marked opsonic or sensitizing action, as they termed it, toward corresponding cultures of streptococci and pneumococci.

Ross (*Lancet*, November, 1906) summarizes our knowledge of the opsonins as follows:

"1. Opsonins act by chemically uniting with the invading bacteria, and so altering them that the leucocytes are able to phagocyte the bacteria and destroy them. It is important to remember that these substances do not stimulate or otherwise affect the leucocytes.

"2. It is probable that there are present many varieties of opsonins in the blood plasma, each having to do with combating a particular kind of microbic invasion.

"3. Opsonins have been shown to be distinct from other bacteriotropic substances,

such as the bacteriolysins, the agglutinins, and the antitoxins."

The leucocytes of healthy or diseased persons seem to be equally active when brought in contact with the same serum, hence the amount of opsonins present in the blood of an individual determines, according to the opsonic theory, his susceptibility to bacterial invasion.

TECHNIQUE.

To measure the resistance of the patient to such invasion, or to find out his opsonic index, special technique has been developed, which may be briefly described as follows:

I. EMULSIONS OF BACTERIA.

Twenty-four-hour or younger growths of the rapid-growing bacteria, as staphylococci, streptococci, pneumococci, gonococci, and colon bacilli, upon inclined agar are washed off with normal saline solution. After the mixture has sedimented, the upper, whitish layer composed of fluid and bacteria is removed with a pipette, and the finer clumps of bacteria precipitated by placing the fluid in a rapidly rotated centrifuge for a few minutes. The supernatant layer, which is still opalescent and is called a bacterial emulsion, should if suitable for work contain the germs in a well-separated condition.

Cultures of tubercle germs are heated, and ground in a mortar with salt solution until the mass is well broken up, and then centrifugated. In case glycerin cultures are used, such as are left in the manufacture of Koch's old tuberculin, the glycerin must be removed by repeated washing with water and finally with 1.5-per-cent salt solution. The washed culture is worked up in a mortar and centrifugated until the clumps are practically all thrown down, and the cloudy layer or emulsion is removed.

The emulsions must be of uniform density. Wright computed the number of germs in a given volume by counting, but McFarland and L'Engle devised an apparatus which is called a nephelometer, consisting essentially of mixtures of $BaSO_4$, put up in sealed tubes, which correspond to solutions containing from 1 to 10 per cent of $BaCl_2$, which serve as standards. The turbidity of the emulsion is compared in similar layer with the standard tubes of $BaSO_4$. They found that the tube containing "5 per cent of $BaCl_2$ corresponds to the most useful bacterial suspension." The permanency of the emulsions varies a good deal. Suspensions of the gonococci should be used at once, staphylococci within two days, etc., while the emulsion of tubercle germs may be employed indefinitely.

II. WASHED WHITE BLOOD-CORPUSCLES.

The finger or lobe of the ear is punctured as in making a blood count, and the blood is allowed to drop directly into normal saline, .85-per-cent solution, containing about 1 per cent sodium citrate; this decalcifies the blood and prevents clotting. The corpuscles are completely precipitated in the centrifuge, and then repeatedly washed with .85 per cent saline and centrifugated, until all traces of the citrate and serum are removed. After the final precipitation the saline solution is withdrawn, and the thin upper grayish layer of the sediment, the leucocytic cream, consisting for the most part of washed white blood cells, is removed.

III. THE SERUM.

Blood is obtained in the usual way, but is collected in small, bent, glass tubes, which can be readily held in the centrifuge and the serum separated. In obtaining normal serum, care must be exercised in selecting a healthy subject, or, what is better, obtain serum from the mixed blood of several normal persons' "Pool."

IV. STAIN.

With the exception of Malta fever and tubercle bacilli, Leishman's stain, consisting of eosin and methylene blue, in combination, or Jenner's stain, is employed. Carbol-fuchsin is employed for the tubercle bacilli.

METHOD OF OBTAINING OPSONIC INDEX.

Special capillary pipettes, graduated into equal divisions, are required; then by means of a rubber tube or bulb equal quantities of

washed corpuscles, bacterial emulsion, and patient's serum are taken up, and all blown out upon a glass slide and thoroughly mixed. The mixture is then drawn up in a small pipette, sealed, and placed in an incubator of the ordinary type, or preferably in an opsonic incubator as proposed by Freeman; it is heated to 37° to 40° C. for fifteen minutes. A similar tube is prepared, except that the normal serum or "Pool" is employed instead of the patient's serum. At the end of fifteen minutes the smears on microscopical slides are made from each tube, fixed, and stained. A good field is selected, one containing many leucocytes, the number of germs counted in the first fifty or hundred observed, and an average per leucocyte determined. If the average in the mixture containing the normal serum is two, we would say that the normal opsonic index is two, and if the mixture containing the patient's blood serum is one per corpuscle, we would say that his index was one-half, etc.

Wright and his pupils, as the result of numerous observations, classify diseases due to bacterial infections:

1. "Diseases in which the bacterial process is strictly localized" or "shut off from the lymph and blood circulations." Furunculosis, lupus, tuberculosis, etc., in fact most chronic infections, belong to this class. "In this class the opsonic index of the blood is persistently below normal, owing to the absence of immunizing stimuli."

2. "Diseases in which the bacterial process is but loosely shut off, especially from the lymph circulation." In these, usually acute, infections immunizing products from the invading bacteria from time to time get into the circulation, and the opsonic index may be normal or above or below normal. Good examples of this class are tuberculous joints, etc.

3. "Diseases in which the bacterial infection is in the blood stream." In this class belong acute infectious diseases, septicemia, endocarditis, Malta fever, etc. In these "the opsonic index is generally below normal."

Wright and Douglas lay down the following general principles for treating cases of bacterial infections:

1. "Isolate in pure culture the causative microörganism."

2. "Estimate the opsonic power of the patient's blood to this microörganism."

3. "If the opsonic index be at or below normal, prepare and standardize a vaccine from this microörganism."

4. "Inoculate the patient with this vaccine with appropriate doses and at proper intervals, as shown by a systematic estimation of the opsonic content of the patient's blood."

PREPARATION OF VACCINES.

The vaccines, with the exception of the tubercle vaccine, consist of emulsions of heated cultures of the particular germ producing the infection. Luxuriant cultures of the desired organism are grown upon inclined agar; the growth is then removed with salt solution and a glass rod, and thoroughly emulsified by shaking in a test-tube, in order to get the germs well distributed and the clumps broken up. The number of germs in a given quantity of the emulsion is then determined by comparing the number of germs and red blood-corpuscles in a mixture of one part emulsion, one part freshly drawn blood, and three parts of normal salt solution. If there are ten times as many germs as blood-corpuscles, the bacterial suspension contains approximately 45,000,000 germs per cubic centimeter. The number of germs present will of course vary with the density of the emulsion. The bacterial suspension is heated at the lowest temperature and for the shortest possible time to kill it. The amount of sterilization will differ with different organisms; 60° C. or less maintained for thirty minutes or less is usually sufficient. Cultures from the vaccine are finally made to insure that it is sterile and safe and some preservative added.

Tubercle Vaccine.—This is the "New Tuberculin Koch," an opalescent fluid, containing the active principle of tubercle bacilli obtained according to the method of Koch.

THERAPEUTIC APPLICATION.

After a proper diagnosis has been made, the patient's opsonic index taken, and the appropriate vaccine prepared, the patient receives his initial injection of several hundred millions more or less of the heated bacteria, and his opsonic index is watched. A short time after the inoculation is made the opsonic index falls lower than it was previous to the injection. This Wright has named the "negative phase." Sooner or later, from a few hours to several days, the opsonic index rises above the starting-point. This is called the "positive phase." The amount of the opsonins in the blood remains stationary for a variable length of time, and then diminishes. As soon as their diminution is noted, a second injection of the vaccine is given, which is followed by a negative phase, but less pronounced than before. Soon the positive phase comes on, reaching a higher level than previously. Thus the injections are repeated from time to time according to the opsonic index of the patient's blood, and the positive phase gradually attains a higher and higher level, until it may be as high as or considerably higher than that of a normal person. In other words, if the vaccinations are properly given, "never during a negative phase," and as a result the patient's tissues are stimulated to an increased production of the opsonins, phagocytosis is increased, the invading bacteria are disposed of, and the patient recovers from his infection. The proper handling of patients according to this method requires the greatest attention to details of technique for obtaining the opsonic index, preparing the vaccine, and the administration of the proper dose at the proper time.

It is too early to know the ultimate results that may be expected from the use of the vaccines, but from personal observation, conversation with other workers, and numerous reports, most of which are incomplete, it seems reasonable to believe that for localized bacterial infections much may be accomplished. Especially does this seem probable for acne, furunculosis, sycosis, abscesses, and lupus, adenitis, and other similar tubercular infections.

In incipient pulmonary tuberculosis encouraging results have been obtained where minute doses of new tuberculin, 1/1000 of a milligramme more or less, have been given, which seemingly show that Koch's original observations were well grounded in fact.

Something has been accomplished in those diseases in which the bacterial infection is in the blood stream.

After a careful consideration of the literature of the entire subject I believe we should recognize the new therapy as an experimental procedure of much promise, but until more extended observations have been made the use of the vaccines should not be looked upon as a settled method of treatment.

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THE EXTERNAL USE OF ALCOHOL IN SURGERY.

Alcohol is used by RAPHAEL (*Therapeutische Monatshefte*, No. 9, 1906) both on open wounds and as a counterirritant on the unbroken skin.

He has had good results from the application of compresses to the abdomen in localized peritonitis, notably two cases of typhoid perforation. Ninety-per-cent alcohol is poured on compresses, which are placed on the abdomen and covered with oiled silk. When it becomes dry the silk is raised, and more alcohol is poured on. Cases of mastitis and phlegmons of the fingers were treated in the same way. Infected wounds are washed with strong alcohol and a compress soaked in the same applied. Eczema and erysipelas are also favorably influenced. In cases of puerperal endometritis the womb is washed out, first with 50-per-cent alcohol, and if this is well borne, with 90-per-cent, and a tampon soaked in alcohol is laid in the vagina. A compress is also placed on the abdomen. All cases handled in this way have resulted in prompt recovery. Its action is not due to bactericidal properties.

EDITORIAL.

THE ORAL ADMINISTRATION OF ANTITOXIN.

The advantages which surround the oral administration of antitoxin in the treatment of diphtheria and tetanus, the two diseases in which antitoxin treatment has so far proved itself advantageous, are so numerous and great as to be manifest even to the lay mind, since it cannot be denied that the natural way of introducing substances into the body for effect upon the organism is by the mouth, and that hypodermic injection is possessed of some danger. Further than this, the necessity of preparing antitoxin in such a way that it can be given by the hypodermic syringe adds so greatly to the cost as to prove a serious obstacle to the free use of these valuable therapeutic agents. On the other hand, the few clinicians who have attempted to treat diphtheria and tetanus by the administration of antitoxin by the mouth have rarely obtained sufficiently satisfactory results to make them inclined to repeat the procedure or to recommend it to their less venturesome comrades.

We note with much interest a valuable original research by McClintock and King which is published in the *Journal of Infectious Diseases* of October 30, 1906, their investigations being made upon animals and men. They find that the administration of antitoxin by the mouth cannot be relied upon to produce results which correspond in value to those which follow its hypodermic use, but they also find that antitoxin is absorbed as such from the stomach, and aids the body materially in combating the infection. A very interesting part of their research is their ability to show that diphtheria and tetanus antitoxin when mixed with trikresol, salol, chloroform and opium are much more effective when they are taken upon an empty stomach, in which the digestive function has been diminished by the simultaneous administration of some drug, than when they are administered to a stomach which is in an active state. In other words, if the digestive juices are present in large quantity they act deleteriously upon the antitoxic substances, and therefore it is important to see, first, that the antitoxin is administered by the mouth during a period of starvation, and second, that several hours must be allowed to elapse for the absorption of these substances before food is taken. The best methods for the purpose of diminishing digestive activity have not as yet been decided by them, but the substances which we have named, and which are commonly mixed with antitoxin for preservative purposes, seem to result in its more speedy absorption than occurs when pure antitoxin alone is given. If any method can be devised by which fairly accurate and reliable results can be obtained from the oral use of these substances, a distinct therapeutic advance will be made, and while the quantity of serum may of necessity be greatly above that now commonly employed by the hypodermic needle, the cost will be markedly diminished because of the simplified method of administration.

ON THE INFLUENCE OF INTRAPERITONEAL INJECTIONS IN CASES OF HEMORRHAGE.

The very wide-spread employment of normal saline solution for the purpose of combating the results of severe hemorrhage has undoubtedly been the cause of saving many lives during the last few years. We have more than once called attention to the need of employing carefully prepared solutions, and have pointed out that solutions which are not of the exact strength which is required by the organism are capable of producing harmful results.

In every case of severe hemorrhage the attending physician or surgeon is anxious to get the normal saline solution into the blood-vessels in the shortest possible space of time, and when the case is too urgent to

permit of hypodermoclysis, it is the habit of many operators to use intravenous injections.

In the *Journal of the American Medical Association* of November 3, 1906, Jampolis contributes an original research which leads him to advocate the intraperitoneal injection of warm sterile normal saline solution in intraperitoneal hemorrhage, not only with the object of obtaining a rapid absorption from the peritoneal surface, but also for the purpose of preventing the formation of large clots, and to aid in the speedy absorption of the blood which has been extravasated. In all he employed fifteen dogs in his experiments, and found that the dogs that received intraperitoneal injections, after internal hemorrhage was produced by artificial means, fared better than those that did not receive the injections. Again, he found that those that received injections showed no peritoneal adhesions when examined some days after the injury, and that in six of the seven that escaped infection organized clots were formed which would ultimately become fibrous adhesions. Again, he found that the blood was absorbed more rapidly in those dogs that received infusion than in those that did not.

The conclusions at which Jampolis arrives as the results of his experiments are of considerable value, but we are not sure that we can agree with the somewhat dogmatic statements which he makes concerning this matter. Thus, he asserts that normal saline should be infused into the peritoneal cavity in every case of hemorrhage not associated with infection because of its effect on shock and its local beneficial influence; and again, he urges that in cases of intraperitoneal hemorrhage accompanied by such severe shock that laparotomy cannot be performed at once, such injections will tend to support the patient until he can rally and receive operative assistance. Lastly, he does not think that such an injection requires great skill, and believes that any general practitioner can employ it. There are certain practical objections to this plan of treatment which deserve consideration. In the first place, it is very questionable whether it is not best that clotting should primarily occur in order that the hemorrhage may be arrested, and it is probable that the saline solution might interfere with this effort of nature to prevent further leakage of blood. Again, there is always a possibility that in giving the injection, infection may take place, either because the solution or the instrument used for injecting it is not perfectly sterile, or because microörganisms from the skin covering the abdomen are carried with the instrument into the abdominal cavity.

The third feature of considerable importance in connection with this subject is the influence which is exerted upon the general system, and the circulation in particular, by the introduction of considerable quantities of fluid into the peritoneal space. This influence seems to have been ignored in the experiments which we have quoted.

Many years ago the Editors of the GAZETTE carried out a series of investigations upon the influence of intraperitoneal injections upon the circulatory condition, which ultimately were accorded the Fiske Fund Prize of the Rhode Island Medical Society. In these investigations they found that while large quantities of fluid could be injected into the bowel under considerable pressure without doing any damage, the introduction of sufficient quantities of fluid into the abdominal cavity to produce even a moderate amount of intraperitoneal pressure resulted disastrously, and that the degree of distention of the abdomen produced by intestinal injection, even when very great, did not produce as deleterious results as a very slight degree of pressure produced by direct injection into the abdominal cavity.

It is also of vital importance that the fluid which is injected shall be of exactly the same temperature as the abdominal contents, as any variation from the normal, either above or below natural temperature of the abdominal organs, produces marked effects upon the circulatory state.

While Jampolis's investigations are of very considerable interest therefore, we are inclined to think that surgeons will do wisely

if they resort to intravenous injections rather than intraperitoneal injections in all such cases, and we very much doubt whether such intravenous injections will damage the patient's chances by aiding the hemorrhage as much as they will be damaged by direct intra-abdominal infusion. Whether the danger of peritoneal infection by these injections is very great must be decided by future investigation. It is a well-known fact that the uninjured peritoneum stands a large amount of insult, and even the introduction of pathogenic microörganisms if they are not present in too great number, and are not too virulent.

In the discussion which followed the report of these investigations we note with interest that Dr. Meltzer, of New York, was firmly convinced that if the hemorrhage occurred from a small vessel it was best to leave it alone, and that if it occurred from a large one the safety of the patient depended upon laparotomy and ligature performed at the earliest possible moment; and Dr. Vaughan expressed the belief that such injections might spread infection from the damaged abdominal viscus, whereas nature, if left to itself, would wall off the infected area, and so localize the difficulty.

THE RELATIONSHIP OF PLEURISY AND PULMONARY TUBERCULOSIS FROM A PROPHYLACTIC STANDPOINT.

Increasing knowledge of the early manifestations of pulmonary tuberculosis reveals the fact that in a very considerable proportion of cases the onset is insidious, not alone in the sense that the symptoms are not well developed, but also in the sense that the early manifestations of disease appear in a form which does not bring the word tuberculosis clearly before the mind of the examining physician. In some instances there is nothing more than a gradual decline in the degree of health without any distinct local manifestations. In others there is what is supposed to be a chronic bronchitis, and in still others the patient is supposed to be suffering from malarial infection or typhoid fever. In still another class of cases, and this is the class to which we particularly wish to refer in this editorial note, the patient is seized with a sharp attack of pleurisy which is supposed to be due to almost any other cause than tubercular infection, and which is expected to get entirely well within a very short time. It may or may not be accompanied by a pleural effusion. Ultimately, however, the subsequent course of the case proves that the primary illness was tubercular in origin. In another class of cases the degree of pain in the chest is so slight that it is ignored by the patient, who ultimately becomes dyspneic because of the gradual development of a large pleural effusion, which may be temporarily relieved by tapping. The lung, however, never expands to its former position, a cough gradually develops, and some months, or years, afterward the physician is forced to the recognition of the fact that an insidious tubercular pleurisy was the starting-point of the general pulmonary disease which ultimately destroys the patient's life.

These facts are, of course, more largely prognostic, diagnostic, and pathologic than therapeutic, and yet they afford us valuable information for practice. They impress upon us the necessity of examining such patients from time to time for a long period after the acute illness; of being continually on the *qui vive* for the development of an active tubercular process; and the need in many cases of sending the patient to a climate where he will lead an outdoor life, and where every means can be taken to improve his vital resistance to such a degree as to enable him to successfully combat the disease. The return of a patient such as we have just described to a badly ventilated office, or factory, or schoolroom cannot fail in a large proportion of cases to be followed by disastrous results. This return would not be permitted in the majority of instances if the possible tubercular character of the condition was borne in mind.

Considerable information as to the character of a pleurisy can be determined not only by a careful examination of the patient, but also of the fluid which is obtained by aspiration if effusion is present. Thus, if an

excessive number of lymphocytes are found in the effusion, it speaks for tubercular infection, but does not prove the presence of a tubercular process. It is not our intention in this editorial to claim that primary tuberculosis of the pleura is common, but rather that the presence of a tubercular lesion near the surface of the lung may first manifest itself by pleural disease, and that the physician must bear in mind that an attack of pleurisy may be very significant of tubercular disease.

THE DISSEMINATION OF TUBERCULOSIS THROUGH MILK.

The very important question of how frequently pulmonary and intestinal, or peritoneal, tuberculosis arises through the ingestion of tubercle bacilli in milk has been before the medical profession for a number of years, and many conflicting views have been expressed concerning it, some holding that tubercular infection very rarely takes place in this manner, and others believing it to be even more frequent than infection from dust laden with bacilli. It would seem to be pretty well proved at the present time that infection can take place by other means than inhalation, and that it takes place by the mouth—that is, through swallowing—with greater frequency than has heretofore been thought possible. The mere fact that tuberculosis of the lungs is so very much more frequently met with than tuberculosis in other portions of the body does not necessarily indicate that infection takes place most commonly by this route through inhalation, because the character of the circulation in the lung, both as to lymph and blood, is such as to favor the lodgment of tubercular bacilli in its tissues.

An interesting communication upon this subject has recently been published by the United States Department of Agriculture (Bureau of Animal Industry, Bulletin No. 86), in which Schroeder and Cotton have reported their experiments with various animals by feeding and injection. Their tests show how the lungs filter the blood, and so are frequently the subjects of tubercular disease, even when the microörganism has entered the body by another channel. They believe that the danger of tubercular infection by means of contaminating food is very marked, and that this possibility must always be taken into consideration in methods adopted for the purpose of preventing the spread of the disease.

EARLY DIAGNOSIS OF CANCER OF THE STOMACH.

It is not yet generally recognized that surgery has advanced to the point of justifying a favorable prognosis in case of cancer of the stomach, providing this condition be diagnosed and subjected to radical operation in its very beginning. It is unfortunately true that clinical, bacteriological, and chemical research has entirely failed to give us diagnostic signs at that stage of the development of the lesion in which operation can accomplish so much. In so far as the surgeon is concerned patients with gastric cancer are usually sent to him when there has been great emaciation, profound blood deterioration, palpable tumor, and long-standing symptoms of pyloric obstruction; when treatment as a rule can be merely palliative.

Modern clinical experience corroborates the pathological findings to the effect that the starting-point of carcinoma of the stomach is usually an ulcer. The Mayos have demonstrated this. Mouillin (*Lancet*, Sept. 22, 1906) states that it is probably true in 90 per cent of cases.

In considering the symptomatology of gastric cancer Mouillin lays some stress on distaste for food and pain as cardinal and early symptoms, especially when they occur without obvious reason in a middle-aged person who has previously enjoyed good digestion, and when they do not disappear in a week or two under ordinary treatment. Mouillin states that when such symptoms are present under such circumstances suspicion should be converted to a reasonable certainty.

Of the various methods of converting suspicion into certainty there are only two of the least use, and only one upon which much reliance can be placed. The first has

to do with a more exact knowledge of the working power of the stomach than can be obtained by inquiring into the patient's sensations; the second is by direct palpation through an incision.

The estimation of leucocytosis during the process of digestion, transillumination of the stomach, the testing of its absorptive power by administering some substance such as iodide of potassium, which ought to make its appearance in the excreta within a few minutes, radiography after ingestion of bismuth or other opaque substances, whether free or enclosed in an albuminous capsule which should dissolve in a certain time, and other methods which have been tried from time to time, give results which cannot be relied upon; moreover they are troublesome. The test meal, preferably salted oatmeal soup, administered after some hours of fasting and gastric lavage, is siphoned in an hour and examined. If the chemical examination shows the absence of free hydrochloric acid or the presence of lactic acid and the presence of the Oppler-Boas bacillus, exploration is imperatively indicated, though these chemical findings are possible in the presence of other disorders, such as simple dilatation, chronic gastritis, and atrophy of the stomach wall. It is, unfortunately, true that negative evidence is of no value, since even though cancer be present hydrochloric acid may be secreted in almost normal quantity and lactic acid may be entirely absent. These investigations are then of service only when the finding is positive.

Mouillin speaks with some feeling against what he calls a roving commission inside the abdomen, but when there is definite evidence that one particular organ is not doing its work as it should do, when there is no reason to be found why it does not, and when it is clear that the patient's health is beginning to suffer, he holds that exploration is no longer a roving commission. Moreover, the operation, even though nothing be found, is in itself entirely innocuous. Mouillin quotes Hemmeter to the effect that "the simple continuance of a chronic gastritis, or nervous dyspepsia, in spite of logical and scientific treatment, accompanied with progressive loss of body weight during three or four weeks, justifies the suspicion of latent gastric carcinoma," and concludes his article with the statement: "If you suspect the existence of cancer you must not wait."

The profession is rapidly coming to the acceptance of such teaching, and although this will doubtless lead to many operations which will remain purely exploratory, it will tend more than any single factor to lessen the ultimate mortality of carcinoma of the stomach.

CONCUSSION OF THE SPINE.

Corner (*Lancet*, Sept. 22, 1906) holds that concussion of the spine is one of the rarest of injuries. As to the pathology of the affection, the injury may consist in molecular disturbance and displacement, multiple hemorrhages, or displacement of cerebrospinal fluid. Corner points out that general concussion of medullated fibers is unknown, but that non-medullated fibers and nerve cells are peculiarly subject to concussion. On this basis he explains thoracic and abdominal shock, concussion of the non-medullated sympathetic system producing a condition of vasomotor paresis. The brain is anchored by the nerves at its base, thus allowing its upper parts to make considerable excursions. The case of the spinal cord is different. The cord is tethered on both sides by the nerves and the ligamentum denticulatum, so that it cannot come into contact with the walls of the canal in which it lies. Therefore general concussion of the spine must necessarily be extremely rare. That local concussion is, however, not so rare and can be recognized clinically is suggested by some cases which Corner reports. The first is that of a man who fell from his horse, and without losing consciousness immediately became completely paralyzed in all four limbs with corresponding anesthesia. After half an hour this paralysis and anesthesia began to pass off. This patient was extremely ill for several weeks, and it was only by means of the *x*-rays after the lapse of six years that the

existence of a fracture of his second vertebra, the axis, was proven to have occurred.

A second case, the patient being an acrobat, received an injury which was followed by an immediate paralysis and anesthesia of all four limbs and the trunk. The symptoms cleared up in about twenty minutes. This patient subsequently recovered completely, and a skiagraph showed that he had sustained a fracture of the body and pedicles of his fifth cervical vertebra.

In the third case the man was kicked between the shoulders by a horse and was found lying semiconscious in his stable. The bruise was found high up between the shoulders, and the lower limbs were completely paralyzed and anesthetic. Breathing was almost entirely diaphragmatic, and the movements of the upper limbs were limited to flexion of the wrists and the fingers. Anesthesia, priapism, and retention of urine were present. The pulse was 44 and temperature normal. Death took place on the second day. Post-mortem failed to show any fracture or dislocation of the spinal column, nor was there any visceral disease. The cord itself showed no sign of hemorrhage within or without. There was no obvious cause for death.

These cases strongly suggest that at least some of the reported betterments or cures following laminectomy for the relief of pressure incident to traumatism would have followed even more surely had the patient been treated conservatively.

It seems well demonstrated that a transverse crushing of a section of the spinal cord is irremediable; it is, however, not generally recognized that symptoms simulating this condition exactly may develop immediately after a trauma which has been contusing but not destructive. The diagnosis of such a condition can be made only by the lapse of time.

REPORTS ON THERAPEUTIC PROGRESS.

VASCULODEPRESSOR DRUGS.

SAUNDBY in the *British Medical Journal* of October 20, 1906, says that every one is well acquainted with the value of heart tonics, and employs them more or less extensively, but it is doubtful if a sufficient use is made of the vascular depressants, which are of great utility in the management of advanced cases in which the heart seems no longer able to answer to the whip. They act by relaxing the peripheral arterioles, and by lowering the blood-pressure they lighten the burden the heart has to bear. Among the best known of these drugs are amyl nitrite, ethyl nitrite, sodium nitrite, glyceryl trinitrate or nitroglycerin, erythrol tetranitrate, mercury in various forms, and iodide of potassium. Ethyl nitrite has long been familiar, as it is contained in sweet spirit of nitre, but is unstable, and although the late Professor Leech, of Manchester, endeavored to bring it into favor it has not proved satisfactory; amyl nitrite is useful, but has obvious disadvantages in certain cases; nitroglycerin in one-per-cent solution is active, safe, easy to administer, and can be dosed to the requirements of each patient; nitrite of sodium has not given the writer equally good results; but all these are very transient in their effects, hence they are more valuable for removing pain than for giving permanent relief to the heart. Nitroglycerin has afforded him valuable assistance in the management of advanced cases of heart disease in which there has been oppression or pain suggesting angina pectoris, his patients being instructed to carry a small bottle containing one or two minims of the solution made up to a teaspoonful dose, which they take when the distress comes on. He prefers this solution to the chocolate tablets. Some years ago a patient was recommended by the late Sir Andrew Clark to use these tablets, but did not experience the desired relief, so one day the author tested them on himself; one tablet produced no effect, so he followed it by a second and a third; in a short time all

three took effect; but this is not what we want to order to help a patient taken suddenly with oppression or pain at the heart.

Erythrol tetranitrate is the drug on which he now relies to produce a permanent unloading of the weight on the heart. It was brought to notice by Professor Bradbury's Bradshaw lecture delivered in 1895, in which it was shown that the lowering of the pulse tension resulting from a single dose lasts fully four hours. Of the truth of this observation any one can convince himself if he will take the trouble to make a series of sphygmographic tracings before and after administering the drug. Dr. John Stead, house physician, of Staunton-on-Wye, Herefordshire, in 1895 took a number of tracings to illustrate this. Since then the author has used it regularly in hospital and private practice, but it is in hospital practice that he has most opportunity for watching its effects, and is convinced that it can afford relief to patients who derive no benefit from other cardiac remedies.

The usual dose of the tetranitrate is one-half grain in a tablet. It should be given every four hours while the patient is awake; but it may cause headache occasionally, very rarely so severe that the drug has to be stopped. The author sometimes combines it with Nativelle's digitaline, giving the drugs alternately with four-hour intervals between the doses of each.

The value of mercury as a vascular depressant is maintained by some authorities, but its action seems to be limited to its power of getting rid of those alimentary poisons which set up vasomotor spasm. Professor Dieulafoy treats chronic disease of the heart and great vessels by hypodermic injections of a solution of biniodide of mercury. After hearing his clinical lecture (see *British Medical Journal*, 1905, vol. i, p. 1337) Saundby gave his method a trial, but saw no good results, while the injections gave rise to much local pain and frequently to suppuration, so that he soon abandoned its use. We all use Baillie's pill (the combination of digitalis, squill, and blue pill) in some forms of cardiac dropsy, for which it possesses an established and well-founded reputation, but it is not known that its effects are in any degree attributable to the action of the mercury it contains on the vascular system. Iodide of potassium is frequently used in combination with other cardiac remedies, less often by itself; its utility is certainly not limited to cases of supposed syphilitic aortitis, but depends on its action as a vascular depressant.

Belladonna is a drug in which the author has no great confidence in the treatment of heart disease, but this may be because he has not become accustomed to the proper indications for its use. Belladonna plasters apparently relieve some kinds of heart pain, but they are dirty, unpleasant things, which interfere with auscultation, and are only fit for out-patients.

Bleeding from the arm and leeching the precordia are means adopted in cases in which there is evidence of marked engorgement of the right side of the heart. Bleeding is the most speedy of all for relieving the heart, but is one which cannot be repeated except at comparatively long intervals; while its effects are prompt they do not last, and the danger is liable to recur. The results are striking, and death has often been postponed by timely bloodletting, but the conditions are generally unfavorable to complete recovery.

THE DIETETIC TREATMENT OF ENTEROCOLITIS.

The *British Medical Journal* of October 13, 1906, contains an article by MORSE, of Boston, upon this topic, in the course of which he asserts that in beginning the treatment of these cases the food should always be stopped entirely for a longer or shorter time. The duration of the abstinence from food must vary in individual cases, according to the severity of the illness and the ability of the given infant to bear starvation. All babies stand starvation well for twenty-four hours, most of them for forty-eight or seventy-two hours, and some of them even longer, providing they are given a sufficient amount of water. They can bear the prolonged withdrawal of food, but they cannot bear the prolonged withdrawal

of water. They must be given at least as much water in the twenty-four hours as they normally get in their food. It is not enough to direct that plenty of water be given; the amount of water to be given must be specified in the same way as are the doses of medicine. If the baby will not take it willingly by the mouth it must be given with a tube. If it is vomited it must be given by the intestine. If it is not retained by either the stomach or intestine it must be given subcutaneously in the form of physiological salt solution; 2 to 6 ounces may be given at a time, according to the age and size of the infant. It is useless to repeat the injection before the preceding one has been absorbed. The water takes the place of the liquid normally ingested with the food, replaces that lost in the vomitus and dejections, aids the heart by keeping the amount of circulating fluid at the proper level, favors the elimination of toxic substances through the kidneys, and diminishes the irritant action of these substances on the kidneys.

While every one now believes in the necessity of an initial period of starvation and water diet in these cases, there is much difference of opinion as to whether milk in some form, or some substitute for milk, should be given when feeding is begun. Those who believe in milk do so on the ground that the pathogenic microörganisms are usually originally in the milk, and would therefore be expected to thrive better in it than in any other medium. This argument hardly seems sound, however. The bacteria enter in the milk simply because milk is the baby's food, not because it is the best culture medium. No one thinks of choosing milk as the medium on which to grow these same organisms in the laboratory; he chooses, rather, preparations of meat or carbohydrates, the very materials from which the usual substitutes for milk in these diseases are made. Clinically, nevertheless, these patients certainly do better when they are fed for a time on some substitute for milk. It is the opinion of the author that the more favorable results obtained from these substitutes for milk are, to a certain extent, to be attributed to the weakness of the food, which in many cases amounts to little more than water. Few realize how little nutritive value these various substitutes for milk have. Barley water, as usually prepared, contains only about 0.05 per cent of fat, 0.25 per cent of proteid, and 1.50 per cent of starch, thus containing only one-tenth as much nourishment as milk. The white of one egg is equal in nutritive value to only three-fifths of an ounce of milk. Beef juice contains 0.6 per cent of fat and 2.9 per cent of proteid, giving a nutritive value, bulk for bulk, only one-quarter as great as milk. Broths contain only about 1 per cent of proteid, and hence have very little nutritive value. In many cases milk preparations in a similarly dilute form will yield essentially the same results as these substitutes. Personally, however, the author almost invariably begins to feed these cases on some substitute for milk. There is another objection to milk foods to which these substitutes are not open, and that is the comparatively large residue from milk, which tends to keep up the intestinal irritation, especially if there are ulcerative lesions. This point must also be borne in mind when beginning to feed with milk.

In choosing the substitute for milk the attempt should be made to select, if possible, a food on which the bacteria which cause the disease grow with difficulty. That is, if the bacteria in question are those which thrive best on starches and sugars, the food should be largely proteid in character, while if the bacteria are those which thrive on proteids the food should be composed of starches or sugars. While this is true theoretically, it is of comparatively little practical utility, because many bacteria thrive well on both sorts of culture media, and because the determination of the etiological bacteria is usually difficult and always requires considerable time. A clinical rule of some value is that sour stools mean bacteria which thrive on sugars and starches, and foul stools those which thrive on proteids. It is the belief of the author that in these conditions babies do better, as a rule, on starches and sugars than on proteid foods.

Personally he uses barley water and milk-sugar in preference to other preparations of starch or other forms of sugar. In this connection it must be remembered that the power of utilizing sugars may be much diminished in enterocolitis as the result of degenerative changes in the liver, and that an excess may easily be given. White of egg in the form of albumen-water, beef juice, and broth may be used when proteids seem to be indicated. White of egg, however, is very likely to produce an angioneurotic edema, while beef juice and broth not infrequently cause very foul, watery stools. The extractives which they contain are also liable to increase peristalsis and to irritate the kidneys. Whatever substitute for milk is used, the amount of liquid must be kept up to the required limit, just as in the starvation period.

The most difficult point to decide in the dietetic treatment of enterocolitis is when to resume milk feeding. The temperature, the condition of the nutrition, and the character of the movements are the best guides. It is seldom wise to give milk when the temperature is much above normal. Many authorities do not begin with milk foods until the movements have become normal in character. Unless this happens within a few days or a week, however, there is great danger of losing more in nutrition and strength on account of the weakness of the substitute food than is gained by the use of the theoretically less suitable culture medium milk. If the temperature is not much above normal it is wiser on the whole, it seems, to resume milk feeding after not longer than a week, even if the character of the movements has not returned to normal.

When beginning to feed with milk it is often difficult to decide in what form to give it. In those cases in which the character and odor of the movements give fairly definite indications as to the use of carbohydrates and proteids in relation to the intestinal flora, as already referred to, these indications should be followed in regulating the percentages of sugar and proteids in the mixture. On general principles, however, a modified milk prepared from fresh milk, low in all its percentages, feebly alkaline and pasteurized, should be given. It is better to give small amounts frequently than large at long intervals. In general, the percentage of sugar may be comparatively high, while that of the proteids must be comparatively low. The fundamental principle, however, is to give a dilute food. It is also of advantage in certain cases to use any or all of the methods of modifying milk which render the proteids easier of digestion and absorption. It is often better, therefore, to begin with whey mixtures, peptonized mixtures, or barley mixtures than with straight modifications. The mixtures must never be highly alkaline, as a high alkalinity tends to throw the work of digestion off of the stomach on to the intestine.

TREATMENT OF TUBERCULAR DISEASE OF THE UPPER RESPIRATORY TRACT.

HAMILTON writes on this subject in the *Australasian Medical Gazette* of September 25, 1906. He believes that in dealing with each case of tubercular laryngitis the first thing we have to decide is whether the treatment is to be palliative only or whether we are justified in doing something more radical to attempt to cure the condition by surgical measures. Lessening the severity of the cough is one of the things which should always demand our attention. Often enough the cough is largely due to irritation, and that in the larynx and not the lung. This can be successfully controlled by sedatives, of which perhaps, first, codeia is the most useful. This drug may be called "the opiate of the larynx," as it seems to act more promptly in allaying laryngeal irritation proper than any other preparation of opium. The following combination the author has used for many years, and knows of none more effective: Codeiæ, chloral croton, ää gr. x; syr. tolutanæ, aquæ laurocerasi, ää ℥j; one drachm (undiluted) for a dose. Second, dionin: it is an excellent sedative, either when given alone or as an adjuvant to morphia. It also relieves pain and puts the patient in a condition of rela-

tive euphoria. It is therefore indicated in cases in which odynphagia is a prominent symptom depending on ulceration of the epiglottis, arytenoids, etc. Third, heroin: it allays cough and is an analgesic when applied locally. It reduces the sensibility of mucous membranes, and is cumulative in its effect, relieving pain at first only for a few hours, and later on for a much longer period.

Odynphagia is a symptom which we cannot afford to allow to continue unrelieved, seeing that the prognosis of these cases depends so very much upon deglutition. For some years past orthoform has held its own as an analgesic, being more prolonged in its action and not open to the objections which apply to morphia and cocaine; but we have now in anesthesin an even more reliable remedy. It is, the author believes, the most valuable local anesthetic for the interior of the larynx which we now possess. Its sedative effect is greater and even more lasting than that of orthoform; it is also less toxic; it may be insufflated as a powder, or the patient may apply it by the self-inflating glass tube invented by Ludin; or it may be applied in solution of oil of sweet almonds, as, unlike chloroform, it does not decompose in contact with fats. The author has had lozenges of anesthesin and adrenalin made, which are very soothing to the throat. Anesthesin is also most useful for postoperative application—*e.g.*, after curetting any of the intralaryngeal surfaces. It relieves the pain and hastens the healing process by preventing the croupous exudation formation which appears on mucous surfaces after operations.

Of the various surgical measures of treatment the author refers to but two: First, curettement, followed by lactic acid or some such application. Lactic acid has been said to be the most abused and misused of local remedies. The true indication for using a strong caustic like lactic acid is when we have to do with a chronic limited ulceration over a shallow infiltration, or one that has been made shallow by removing the main deposit by curettement. It is not necessary or desirable that this procedure should be painful or disagreeable to the patient; therefore the parts should be previously rendered anesthetic by the application of a mixture of cocaine and adrenalin. The application of lactic acid to an unbroken surface is of very questionable value, and if a strong solution be used it only gives the patient distress without any good resulting therefrom. Some one of the following applications may be substituted for lactic acid in certain conditions: Pheno-salyl, phenol-glycerin (which the French laryngologists use), formalin in glycerin (recommended by Bronner), and sulphoricinate of phenol. In sloughy, indolent ulcers a preliminary application of peroxide of hydrogen is distinctly beneficial; but to be effective this medicament must be pure, of which none are more reliable than peroxide of hydrogen purissima. Second, ablation of the epiglottis and the arytenoids. Of all parts of the larynx the epiglottis is the least amenable to treatment. It resists longer the good influence of sanatorium treatment; therefore its removal is a very valuable therapeutic agent. It can be done under local anesthesia, and Grünwald's cutting forceps are now used by all operators in preference to the cold or galvanic snare. It is quite remarkable what prompt and complete relief follows its removal. Immediately after the operation the patient can swallow with comfort, even when deglutition had been painful in the extreme before the operation. The same applies to ablation of the arytenoids, for which Lake's forceps are used. Scarification of edematous surface is another procedure which is often necessary to relieve dyspnea. This, however, should not be resorted to indiscriminately, seeing that the scarifications may open up deeper tissues to further infection. Mackenzie's sheathed knife is a good instrument for this purpose. It was to obviate the danger of reinfecting new surfaces that Grünwald recommended the galvanocautery instead of the knife. Of this treatment, however, the author has as yet no experience. That the epiglottis can be removed without any inconvenience in swallowing resulting therefrom to the patient this operation clearly

demonstrates, and it shows that the epiglottis plays no important action in deglutition. Its main function is not to prevent food passing down into the glottis, but to keep the secretions of the upper air-passages from entering the larynx while it is in a state of rest.

As the tendency for the last few years has manifested itself in doing away with drugs for the general treatment of tubercular diseases, to depend upon open air and the sanatorium, with the addition of purely symptomatic medicinal treatment, the author concludes by recording his experience of two drugs which he cannot but think have a very distinct utility *per se*. These two are thiocol and ichthyol.

1. Thiocol is a remedy which deserves special consideration from the physician as a remedial agent in tuberculosis. It is a derivative of creosote. It is soluble in water, almost tasteless, and can be administered even to infants. It is a remarkable stomachic, and has antipyretic action. By its stomachic action it increases appetite, while its antibacillary power and its property to increase the agglutinating functions of the blood and also the emigration of leucocytes probably explain its beneficial influence upon tubercular foci. More guaiacol can be brought into the system by thiocol than by any other preparation of creosote. It improves appetite, ameliorates cough and expectoration, and brings about an increase of weight. It has been proved that 70 to 80 per cent of the ingested thiocol is absorbed, and that the drug is not split up into guaiacol and other compounds. The germicidal efficacy of the blood serum during the administration of thiocol has been demonstrated, and it has been found that such serum is directly inimical to streptococci. Cases are recorded in which examination of the sputum showed the presence of tubercle bacilli in abundance associated with pyogenic cocci and various bacteria, and after a month of thiocol treatment a great diminution of the tubercle bacilli had taken place and the associated bacilli had entirely disappeared. Hemoptysis is no contraindication for its use.

2. Ichthyol. This drug is somewhat similar to thiocol; it, too, acts by improving nutrition. It lessens cough and expectoration. Both these medicines deserve a place in the routine treatment of tubercular diseases, given internally and applied locally, and according to the author's experience, extending over a long period, nothing but good can follow the regular and systematic use of the same.

THE VAGINAL TAMPON—SOME POINTS OF PRACTICAL INTEREST.

SOUTHER in the *Lancet-Clinic* of October 27, 1906, writes on this subject.

For antiphlogistic purposes he says the reducing of the size of the uterus is a matter of drainage—drainage from, or into, two avenues, viz., the vessels, veins and lymphatics, and through the os uteri. The first-named channels we must aid all we can by putting the uterus in proper position, correcting deviations, and removing infection, which necessarily causes an increased flow of blood to the organ.

The uterine cavity should be relieved of all excessive mucous membrane, hypertrophied tissue or polypi, and remains of incomplete abortion or miscarriage. The question of packing, or simply inserting a gauze drain in the uterus, depends on the individual case and on conditions present. For packing, gauze is probably the best material we have, but should be used wet or moistened with one of the antiseptic solutions mentioned, as it drains better, and can be packed very tightly when pressure is desired. After the above has been accomplished the character of tampon depends on the immediate result desired and amount of support necessary. For simple depleting a large, loose tampon wet with some of the glycerides, with their hygroscopic action, gives best results. Where cases are confined to bed a copious hot douche of two to five gallons, four times a day, until a fair degree of contraction and involution takes place, is certainly followed by good results. The douche nozzle should be inserted posterior to the cervix, the cul-de-sac kept clean, and by so doing produce as much

depletion and contraction as possible. Following this the boroglyceride tampons should be used daily for simple depletion in long-standing cases. In acute cases he has used mostly carbolic acid and iodine, separate or combined, followed with alcohol; or $AgNO_3$, 10 per cent, applications to the cervix, followed with cotton tampons medicated with ichthyol 25, glycerin 250. This combination has given him excellent satisfaction in acute vaginal and cervix cases, and seems to be almost a specific for venereal warts invading the vagina and cervix. Early in these cases the tampon should be used every day, and the cervix carefully cleansed before its introduction.

This treatment has given relief in every case of acute gonorrhea with endocervicitis, frequent urination, and profuse discharge, within forty-eight to seventy-two hours, and sometimes almost the first application. In this way we are able to control the discharge, and hence do not have the disagreeable effects of the parts being bathed in pus.

The question of lamb's-wool tampons, or tampons made of springy materials, is well worthy of consideration, and these are very excellent in deviations, but not so strongly indicated in hemorrhage and depletion as cotton, because it cannot be packed so tightly and its power of absorption is not so great. However, a material that retains its bulk and does not pack certainly has some advantages over absorbent cotton in cases of true version.

NOTES ON SOME ANESTHETIC METHODS.

McGowan in the *Australasian Medical Gazette* of September 20, 1906, in speaking from a long experience of morphine and atropine antecedent to a general anesthetic, points to some disadvantages of such methods. Atropine and scopolamine have much the same characteristics, and his observations on "mixed" anesthesia with morphine and atropine, followed by chloroform or ether, will apply equally to morphine and scopolamine followed by a general anesthetic:

(1) The small amount of chloroform used is no criterion of safety. How often have we not heard of deaths when only a few drops have been exhibited to the patient? (2) With this mixed anesthesia the eye reflexes, and in particular the pupilary reflexes, are utterly unreliable. (3) One has difficulty therefore in judging the depth of the anesthesia, and in saying how much is due to morphine and how much to chloroform. (4) In consequence the patient often most inconveniently emerges suddenly from an apparently deep anesthesia, and presents active clonic or tonic movements of which one has no warning. (5) If respiration ceases under chloroform in such cases, much more difficulty is experienced in causing the respiratory center to respond to stimulus than if the center had not been previously dulled by morphine. (6) The narcotics fix the chloroform in the blood for too long a period after the operation is over by their action in checking excretory functions. Prolonged postanesthetic coma and vomiting are thus often noticed. These are disadvantages experienced personally by the author in the use of such mixed anesthesia, though of course he is not adversely criticizing the morphine and scopolamine or morphine and atropine followed by a general anesthetic as routine practice.

In one class of operations—that is, on the rectum—the mixed anesthesia gives excellent results. One-fourth grain of morphine and 1/200 grain of atropine half an hour before ether anesthesia quite averts the alarming laryngeal spasm and general shock from dilating the sphincter ani, so often seen under chloroform.

DUODENAL ULCER.

Hutchison in the *Clinical Journal* of October 17, 1906, says that the treatment of duodenal ulcer, like that of ulceration of the stomach, may be either medical or operative. The first involves putting the patient at rest, careful feeding, and the use of local poulticing and the administration of bismuth and the alkaline earths according to the method often described by the

author as "ulcer cure." Operative treatment resolves itself into the performance of gastroenterostomy. In all doubtful cases the author believes it is right to try medical treatment first, but assuming that melena has occurred, and that the diagnosis is no longer in dispute, is it worth while to waste time in an attempt to get the ulcer to heal, or should one recommend early operation? Now there can be no doubt that healing may occur. In one of the author's patients, for instance, after a severe attack of melena, the symptoms disappeared and he remained in perfect health for two years. The author doubts, however, whether one is justified in trusting to this. Certainly in that case the ulcer ultimately broke down again, or fresh ulceration supervened, and operation had to be performed. When one remembers that every patient with a chronic duodenal ulcer is, so to speak, on the edge of a precipice and that at any moment perforation may occur, with the tremendous risk to life that such an occurrence involves, and when one sets against that the comparative safety of a timely gastroenterostomy in experienced hands, then one must decide that it is one's duty to advise operation in every certain case at once. The results of such a proceeding are, in the great majority of cases, entirely satisfactory, although in one case known to the author the patient again suffered from severe bleeding from the bowel, fortunately, however, with ultimate restoration to health.

STANDARDIZATION OF PHARMACEUTICAL PREPARATIONS.

The great advances which have been made of late years in our knowledge of the action of drugs are evident from even a cursory examination of recent works on pharmacology. As a result a stimulus has been given to the teaching of this subject, and its great importance in the medical curriculum is now recognized in our schools. We may fairly ask whether the scientific preparation of the drugs used in daily practice has kept pace with researches upon their action. Definite chemical compounds such as magnesium sulphate or morphine are available in a pure form and the dose can be accurately measured, and it is no less desirable that in the administration of ordinary tinctures and extracts owing their action to the presence of an alkaloidal or other compound, the proportion of this substance should be known. With this object in view some of the more powerful medicines in the Pharmacopœia are standardized by chemical means. The determination of the amount of strychnine in the compounds of nux vomica leaves little to be desired. It is doubtful, however, whether the estimation of morphine in opium gives the best possible measure of the power of that drug, for there is a not inconsiderable quantity of other active alkaloids. In the preparation of belladonna, ipecacuanha, and quinine the total alkaloids are determined by titration or weighing, and in tincture of jalap the amount of resin.

There remain many active drugs of the strength of which there is no real guarantee: such are digitalis, strophanthus, squill, ergot, lobelia, male-fern, thyroid extract, the vegetable purgatives, aconite, hyoscyamus, and stramonium. We may, perhaps, exclude the three last named, for from aconite aconitine is prepared, from hyoscyamus and stramonium the alkaloids hyoscine, hyoscyamine, and atropine, and these substances may come to take the place of the crude drugs. From digitalis substances purporting to be pure principles have been obtained and extensively tried, but most observers are agreed that better results follow from the infusion and tincture than from the samples of digitalin and digitoxin at present on the market. The careful methods of preparation employed by pharmacists are a sufficient safeguard against such an uncertainty of composition as might render the use of three unstandardized medicines dangerous. On the contrary, such drugs as digitalis, thyroid extract, and stramonium are used daily with the greatest success, and lead to an incalculable alleviation of disease. Nevertheless it is evident that those medicines are not employed under the most advantageous

circumstances permitted by the present state of science. The application of pharmacological knowledge at the bedside is deprived of much of its force by the want of exact information as to the real strength of a tincture or an extract. Valuable time is thus wasted, for an insufficient dose is at first prescribed in order to avoid the possibility of giving more than is necessary or desirable.

Owing to the great complexity of organic products, accurate standardization by chemical procedures is not at present possible in all cases, although with the examples before us of the daily employment of such substances as strychnine and caffeine we have good reason to look forward to the extraction in a pure form of the active principles of all drugs, and to their use under constant conditions of dosage and composition. In the meantime, and especially where we are dealing not with alkaloids but with the more elusive glucosides, such as those of digitalis, strophanthus, and squill, physiological standardization seems to be the only alternative. Pharmacologists have determined the lethal dose of most drugs for animals, per kilogramme of body weight, and by a comparison with these figures the strength of any preparation can be ascertained and adjusted to a definite standard. This method is used in the manufacture of antitoxin. It may be objected that figures obtained from animals, and particularly from cold-blooded animals, such as the frog, are not applicable to man. We believe that this argument has no further force, since while the same drug may affect different species in a different degree, and frequently does, a preparation which is of double strength for one animal will be of approximately double strength for another. Thus, although the susceptibility of an animal for a drug might be less or greater than that of a man, nevertheless if the lethal dose of a preparation of the drug for that animal were ascertained, it would give a reliable guide to the strength of the tincture or the extract. Again, the variations of susceptibility which occur in different species have been carefully ascertained for the animals used in pharmacological researches as compared with man, and can be fully taken into account, and when necessary allowed for. Indeed, the standardization of drugs by the physiological or biochemical method has great advantages over the purely chemical, for in the former we are dealing with the same kind of reaction as that to which the drug owes its medicinal effect, namely, the reaction of the living tissues.

In the case of digitalis, strophanthus, and squill we have recently referred to the great necessity for the adoption of a physiological standard, such as that obtained by determining the lethal dose for a frog of a given weight under constant conditions. In the administration of thyroid extract, or of ergot, if the desired effect be not produced it would be of special value to be certain that the preparation used was not at fault. Although we must recognize that the drugs under discussion cannot be so exactly measured as pure substances, yet we have a right to expect that such accuracy as the present state of chemical and pharmacological science can afford should be at the disposal of every practitioner of the healing art — *British Medical Journal,* Sept. 8, 1906.

THE TREATMENT OF EPILEPSY.

In the *New York State Journal of Medicine* for October, 1906, SPRATLING asserts that the one factor that has done more than anything else to retard the successful treatment of epilepsy since Laycock first used them for this purpose in 1847 has, in the judgment of the author, been the universal and irrational use of the bromides. It is a significant fact that in the prebromide days the percentage of cures in epilepsy, according to excellent authorities, was greater than it is now. He believes the bromides have a limited sphere of usefulness in epilepsy in that they lessen cortical irritation and hold attacks in check while other forms of treatment are being applied and are having an opportunity for action. In themselves alone, it is the belief of the author, they are powerless to cure epilepsy. Why give a drug that is mildly destructive in action

in the long run—and the bromides must be given for years—to reconstruct a congenitally weak brain, or to help eliminate a systemic poison?

If we give the bromides we should begin with six or eight grains three times a day, but not go beyond fifteen grains, unless for a limited time to check serial attacks or status epilepticus. The bowels should be kept freely open, and the skin highly active by baths and massage, so that the danger of bromic acne and general bromism will be lessened.

We can adopt Toulouse's method of salt starvation, and get better results from fifteen grains of bromide a day with no sodium chloride in the food than we can with thirty grains and the usual amount of salt in the food.

Toulouse's plan is a good one, but requires special food preparation, and in many instances this is not easy.

A still better plan is to use the pure bromine in the form of bromipin, giving it as an emulsion. It does not produce acne, is not apt to disturb the alimentary canal, and most patients gain in weight under it.

The opium-bromide treatment of Fleschig so popular some years ago has been discarded.

Borax in fifteen- to twenty-grain doses is often effective when the bromides fail to suppress the attacks.

Chloretone was found useful by Weeks in three- to five-grain doses, while he had used brometone in five-grain doses, morning and noon, and ten at night, with excellent results in several cases during the past two years.

A boy of eighteen came under the author's care with his face a mass of foul sores from one hundred and twenty grains of bromide he had been taking daily for ten years. His epilepsy was mostly of a motor type. The writer stopped the bromides as quickly as possible, put him on brometone, and the effect was almost miraculous. In nine weeks his skin cleared up almost like a baby's, his eyes brightened, his appetite increased, and his attacks dropped from five to seven in a month to one in three months. He is still improving, and the author looks for a cure in two or three years more. He is also taking iron and strychnine, cascara sagrada, and is held to a most absolute diet, under a strict form of living, being under the supervision of a competent person constantly.

Zinc, urethane, simulo, solanum carolinense, which is an excellent preparation in many selected cases, trional, and the coal-tar derivatives, are all more or less useful, though their value is not apt to be lasting.

The author believes that surgery has a field of usefulness in epilepsy, and we are learning to appreciate more fully as we operate with more care. and in cases selected with greater caution. Outside of operation on the brain—which of course is the great field for surgery in epilepsy—many cures have been effected at Sonyea through abdominal and other operations, the abdominal work being wholly among the women. Cases for laparotomy should be studied for months previously, and especially observed at the time of the menstrual epoch.

Roswell Park resected the cervical sympathetic nerves and ganglions on both sides of the neck in three cases nearly three years ago at the Colony, the result being that two of them have had no attacks since. All presented a definite aura of violent flushing of the face just before the fit.

Errors of refraction should be corrected. Foreign growths in the nose, adherent foreskins, old scars that are tender, and other focal conditions that may incite convulsions should be dispensed with.

Do not look for brilliant results from surgical intervention in epilepsy immediately after the operation. Rather regard the operation as the beginning of a new course of treatment, and keep up the use of other remedies with greater persistence than ever. In fifteen years the author has learned that a surgical operation performed this year may set in progress a cure that will not be complete for several years, though the operation originally began the cure.

AN EXTRAORDINARY CASE OF POISONING BY MORPHINE.

An inquiry was recently held at Brighouse as to the death of a man who had died from an overdose of morphine. The interest of the case lies in the huge dose of the poison which was taken. The deceased was aged forty-three years and had lived for some time in China, where he had acquired the morphine habit. As is frequently the case in such circumstances he had accustomed himself to take very large doses, and Mr. R. T. Farrar, who gave evidence at the inquest, stated that he used to take as much as 60 grains of hydrochloride of morphine in a day. By means of a telegram and prefixing the title of "Doctor" to his name the deceased obtained two gross of pills, each pill containing a dose of two grains of hydrochloride of morphine, equivalent to a total quantity of 576 grains. He took this enormous dose within twenty-four hours, and two hours before his death he swallowed 100 of the pills—that is to say, a single dose of 200 grains. After a short period of excitement paralysis of the respiratory centers ensued, which ended fatally.

We believe that this is the largest dose of morphine that has been reported, and it is remarkable that the man should have lived so long after taking it. The toleration established by prolonged use of the drug is the only explanation that can be given. The coroner rightly commented on the comparative ease with which morphine can be purchased by non-medical persons. The unusual dose of two-grain pills might perhaps have given rise to suspicion, but as the telegram purported to be signed by a medical man the druggist apparently did not make further inquiries. There are several practitioners in the Medical Directory of the name which was on the telegram, so that reference to that volume could not have been of much assistance. It is difficult to suggest how such occurrences can be avoided, but we think it would be well for druggists not to send large quantities of poisonous drugs in reply to a telegram unless the sender of the telegram is known to them or unless the name and address can be corroborated by means of the Medical Register or the Medical Directory. Another point of interest is the manner in which death took place. The symptoms were of a tetanic character, and the usual comatose condition did not develop. This mode of death is fully recognized in fatalities from morphine poisoning, but it is not of common occurrence.—*Lancet*, Sept. 22, 1906.

HEART TONICS.

In the *British Medical Journal* of October 20, 1906, SAUNDBY writes in an interesting way on this subject. He well says that among reputed heart tonics digitalis and its alkaloids hold the first place. In its various pharmaceutical forms it is a most trustworthy drug, and it is not quite obvious how it acquired the bad name that it seems to have borne in the first part of the last century. When the writer commenced practice it was common to meet men who considered it a dangerous cumulative poison, which in ordinary doses was liable to cause unexpected and alarming symptoms. Dr. Balfour used to point out that when the infusion of the Edinburgh Pharmacopœia was in use it was customary to give the equivalent of from 3 to 12 grains of the leaves three times a day or more often. Dr. Blackall, of Exeter, in his book on dropsies, published in the year 1813, wrote that the common people in his neighborhood were in the habit of using very strong and copious infusions of digitalis made by throwing boiling water on the leaves, stem, and root, without any measure or weight; and it can be well understood that with such rude pharmacy accidents might happen. He recommends an infusion made with a drachm of the dried leaves to half a pint of boiling water, which is more than twice the strength of the present infusion, but the only inconvenience of which he complains is that it may "upset the stomach and cause so much disgust that there is difficulty in persuading patients to resume its use."

In the days preceding the publication of the British Pharmacopœia it is probable that a considerable source of inaccuracy in dosage arose from the unequal forms in which the medicine was dispensed and the extreme difficulty of calculating their relative strengths. All this has for us only a historical interest, as at the present time we are sure of getting accurately-made preparations, and we never have to complain, as Blackall did, of digitalis becoming inert from the "powder being kept in paper, or in a bottle which was often opened for use." The tincture is the preparation usually employed, the standard dose for an adult being 10 minims three times a day, in which amount it is perfectly safe and manageable, but if given more frequently its cumulative effect may be produced, the pulse dropping suddenly, so that this dose should not be exceeded unless the case is carefully watched. Nor is there much reason to complain that these doses irritate the stomach, unless marked gastritis is present, when it is better to choose some other method of administration, as in pills containing the powdered leaves; but the best form in these circumstances is Nativelle's granules of digitaline, which are free from any irritating action on the stomach, and are therapeutically most efficient.

The general indication for the use of digitalis is a weak, rapid, and irregular pulse, or the presence of edema. The much-debated question of its utility in aortic disease has not been settled by Foster's discovery that when it slows the heart the prolongation affects the diastolic period more than the rest of the cardiac cycle, as when the heart's action is slowed from any cause whatever the diastolic period is lengthened disproportionately. In all cases of aortic disease the pulse should beat more quickly than normal in order to keep up the circulation; but so long as digitalis does not reduce its rate below 80, the good effects are as apparent in aortic disease as in other conditions.

Strophanthus has the same action as digitalis, but is not more manageable or trustworthy. On its first introduction the writer used various preparations of it with unsatisfactory results, and a small quantity of a tincture prepared by Professor Fraser, which acted very well, but was not enough for extended operations. On Professor Fraser's recommendation the writer procured Duncan and Flockhart's tincture, but this proved to be no better than the others. He then obtained a sample of strophanthus seed and sent it to Professor Fraser, who pronounced it to be not *Strophanthus hispidus,* but some other species, yet he was assured that it was the only seed at that time in the English market, from which all the tinctures in use were prepared! This led the author to give it up, but some years afterward he had all the specimens in the market reëxamined, and all were genuine and active. He uses it occasionally when digitalis fails, but knows of no indication for giving preference to it.

The author has used the tincture of convallaria in advanced cases of aortic disease, giving it in 15-minim doses in combination with caffeine or theobromine, in which form it has answered his purpose very well, but he is unable to speak of its action by itself.

After digitalis the most useful cardiac tonics are caffeine and theobromine, whose chemical composition and therapeutic action are nearly identical. Caffeine citrate in 5-grain doses may be kept in solution by adding a little citric acid, but theobromine in the proprietary form of diuretin—a double salicylate combined with sodium, of which the dose is 10 grains—has the advantage of being soluble, while a similar double salt of caffeine prepared for him did not possess this useful property. Both are good stimulants to the heart and also true diuretics—that is to say, they act not merely by increasing its water-secreting apparatus. Of their value in combination with digitalis he has no doubt.

Nux vomica and its alkaloid strychnine are powerful heart tonics, especially in the form of strychnine injections, which should not be postponed until the patient is *in extremis.* These injections will relieve heart pain when other remedies have failed, and their use can be combined with that of other

cardiac tonics given by the mouth. The usual dose is 5 minims, to be injected every four hours, but this quantity should be increased and the action pushed in desperate conditions, adding one minim at a time to the quantity and diminishing the interval to three or two hours.

THE SALT-FREE TREATMENT OF EPILEPSY.

In the *New York Medical Journal* of October 20, 1906, GORDON reports his experience with this method. His study of thirty-seven cases led him to the following conclusions:

Sodium chloride plays undoubtedly an important rôle in the chemistry of the organism. The suppression of alimentary salt in the diet of epileptics has a favorable effect on epileptic seizures inasmuch as it reduces their frequency and their severity. It is of the same value in the treatment of epilepsy as the strict observance of dietetic and hygienic rules. Both factors combined aid considerably in reducing and controlling the seizures. Reduction or complete removal of sodium chloride from the diet gives better results while bromides are taken than while they are not taken. The fact that suppression of alimentary salt puts in action the chloride molecules of the organism, that the elimination of various products of metabolism, such as urea, is *ipso facto* facilitated—this fact, the author asserts, is highly corroborative, if not absolutely so, of the toxic pathogenesis of epilepsy. That there is a hypertoxic underlying basis had been proved beyond doubt by various investigators. Suffice it to mention among recent writers Jules Voisin, Peron, and R. Petit.

An uncomplicated experiment led the author to the same conclusion. To some of his patients who happened to have attacks at regular intervals he administered methylene blue a few hours before a seizure. During the convulsions the urine which they voided involuntarily was clear, but the greenish-blue color began to appear after the seizures. This experiment naturally leads to the idea of retention of poisonous material in the organism and to a general intoxication of the tissues. The nervous phenomena of an attack are the consequences of an intoxication which reached its maximum.

The studies on the rôle of sodium chloride are of great value. Their application to other pathological conditions, such as ascites, edema, cirrhosis of the liver, and cardiac and renal diseases, is now well known. It is gratifying to utilize this knowledge in the therapeutics of nervous diseases, in the presence of which we feel frequently powerless. Dechlorization is certainly not a specific for epilepsy, but it adds a new element to our meager neurological armamentarium. It also adds considerable value to our old conception of epilepsy as a disease in which faulty chemical processes play an enormous rôle.

INJECTIONS OF ALCOHOL IN NERVOUS AFFECTIONS.

The medical profession is beginning to recognize the efficacy of injections of alcohol in the treatment of at least two conditions hitherto considered rebellious to therapeutic methods, viz., trigeminal neuralgia and facial spasm. In a communication made to the Neurological Society of Paris on July 5, M. Brissaud, M. Sicard, and M. Tanon gave interesting details of the application of the method to various other conditions usually accounted hopeless. The contact of one or two cubic centimeters of alcohol (70 to 80 per cent) with the actual conducting fibers of a nerve trunk is followed by the diminution or disappearance of sensory or motor spasmodic phenomena in the distribution of the trunk. This procedure, however, is to be avoided where there is any neuritis or other inflammatory process at work, and its use in cases of sciatica has merely aggravated the symptoms. On the other hand, in the contracture of hemiplegics and paraplegics, where spontaneous clonus is a distressing complication, in certain cases of athetosis, in spasms of the muscles of the neck, and in cramps arising

from profession or occupation; the writers have obtained singularly good results. It is true no one of their cases has as yet been under observation for longer than two months, and therefore conclusions may be somewhat premature, but notwithstanding this reservation the significance of the facts cannot be neglected. Preliminary experimentation on animals made it clear that the injection of alcohol into the sciatic nerve was succeeded by transient paresis or paralysis in the leg and foot, accompanied by the reaction of degeneration in the muscles involved, and histological examination showed the presence of Wallerian degeneration beyond the site of the puncture. Weaker solutions (30 or 40 per cent) did not produce any motor impairment, but again degenerated fibers were found in the nerve trunk.

A commencement of the application of this method in man was made with certain cases of contracted foot in hemiplegia. At a point just below the exit of the sciatic from the pelvis two cubic centimeters of 80-per-cent alcohol, with the addition of rather less than a centigramme of stovaine for each cubic centimeter, was injected into the nerve. Immediately after the injection the patient had a sensation of heat and of heaviness in the leg, and the skin of the foot was seen to be reddened and felt warm to the touch; there was a certain amount of tactile anesthesia on the outer side of the leg, there was paresis of the toes, dorsiflexion was weak, and the tendo Achillis jerk was entirely abolished. In particular, all clonic and spasmodic movements of the foot vanished. Two months later the condition remained the same except that the paresis was less, the paresthesia had begun to diminish, and the anesthesia had disappeared. There was no indication either of trophic disturbance or of alteration in electric excitability. The writers propose to continue their researches in the domain of other nerve trunks, and with further experience the technique will no doubt be improved and the dosage standardized.—*Lancet*, Sept. 22, 1906.

SOME REMARKS ON THE THERAPEUTIC ACTION OF THE IODIDES.

BURNET writes on this topic in the *Lancet* of September 8, 1906.

In the course of his paper the author discusses the employment of iodides in cases of angina pectoris. He is of the opinion that to be of any real service the patient should have from 30 to 60 grains per day, and that this administration should be kept up for months. A patient under his care some time ago for the disease was given one and a half drachms of iodipin in warm milk three times a day for periods of a month with a week's interval between for a year. During that time he had no attack, although previously he had one on an average every four or five months. Huchard, whose knowledge of heart affections must be considered very extensive indeed, did not hesitate in severe cases to give as much as from 12 to 15 or even 20 grammes of iodide of potassium in a single day. This may be by some regarded as heroic treatment, but in the author's opinion it was fully justified by the results obtained. Arteriosclerosis, which is so often present in these cases, is not necessarily a source of heightened blood-pressure. Rolleston points out that the iodides in such cases act by stimulating the secretion of the thyroid and not by their depressant effect upon the circulation. In this connection he refers to a paper by A. Fraenkel, in which he says that the pathology of angina pectoris is to be found in a sclerosis of the coronary vessels, the angina occurring in the course of syphilis, gout, and aneurism being due to this. In other cases a spasm of the smaller vessels of the heart produces an anemia and the pain thereupon ensues. This spasm, which is probably the source of every attack of true angina, is relieved by the use of iodides, of which the author prefers the sodium preparations as less likely to interfere with digestion. This view of the treatment of angina by means of iodides is a very rational one, and is to some extent in accordance with the author's opinion, to which he presently refers—namely, the

iodides relieve angina by their specific antispasmodic action.

Passing now to the consideration of the therapeutic action of the iodides in cases of respiratory disease, we find ourselves on less uncertain ground. It is with this sphere of their action that the author is most familiar. In chronic diseases of the respiratory system he knows of only two or three remedies which may be absolutely relied on, and one of these is the iodide of potassium. Some three years ago, while the author was engaged in making a series of observations on pulmonary fibrosis as met with in stonemasons, he found that the two drugs which were of most value were iodide of potassium and ichthyol. With these two remedies alone he was often able to alleviate the symptoms very materially indeed. When the dyspnea which in such cases generally results from emphysema becomes a marked feature of the case, then iodides given regularly over a somewhat prolonged period almost always afford relief from this distressing symptom.

BLACKWATER FEVER DUE TO ADMINISTRATION OF QUININE.

The question whether blackwater fever can be induced by administration of quinine has been much discussed. In the *South African Medical Record* Dr. A. D. Ketchen has reported the following important case, which appears to be conclusive: An Austrian, aged twenty-eight years, was admitted into the New Somerset Hospital, Cape Town, on April 17, 1906. He gave the following history: In March, 1903, he was first attacked with malaria when in East Africa. Under Koch's treatment (one gramme of quinine every ninth and tenth day) the symptoms disappeared in two months. In November, under the influence of fatigue and privation, the fever recurred. One morning when his temperature was rising he took quinine, and after half an hour he passed very dark urine. Under diluent drinks the urine became clear in twenty hours. When the temperature had been normal for two or three days he again took quinine, and the black water recurred. Afterward he had short malarial attacks, but did not take quinine. Then a severe attack, in which the temperature rose to 106.7° F., occurred. When he recovered his medical adviser told him to take quinine again, beginning with a small dose and gradually increasing. On taking about one-tenth of a half-gramme tablet (about three-quarters of a grain) black water occurred in half an hour. Later he took one-fortieth of a tablet, with the same result. For the fourteen months preceding admission he had had no more malarial attacks, but he suffered from dysentery.

On admission he was somewhat spare and anemic. The spleen extended four inches below the ribs. There was slight dilatation of the heart, and the first sound terminated in a soft systolic murmur. The liver was slightly enlarged. The urine did not contain albumin or blood. The temperature was normal. He was kept in bed, given iron and arsenic, and dieted for the colitis. On the 20th a blood-film showed one or two parasites of the estivo-autumnal type. On April 23, at 8 A.M., by mistake he was given 10 grains of ferri et quininæ citras (containing about one and one-half grains of quinine). At 10 A.M. he noticed that the urine was black, and concluded that he had taken quinine. At 6 P.M. the temperature was 102°. Ignorant of the facts the house physician prescribed 10 grains of quinine, which was given at 11 P.M. At 10 P.M. the urine was clear and the temperature had fallen to 99.4°. At 2 A.M. on the 24th the temperature was 104.2°, he had a rigor lasting twenty minutes, and vomited. When seen in the morning the skin was of a saffron color and the conjunctivæ were yellow. He had been sweating profusely. The urine was black and contained albumin and casts. The temperature rapidly fell and on the 25th was normal, when the yellow color had almost disappeared and the urine was clear and contained a trace of albumin. On the 26th six grains of quinine were given at 6 P.M., and at 10 P.M. the temperature had risen to 102°, and he was again passing black water with the same

symptoms as before. Under a liberal diet, iron, and arsenic he rapidly improved. As doubt was expressed that so small a quantity of quinine as that contained in ten grains of ferri et quininæ citras could cause an attack this dose was given at 8 A.M. on May 8. At 10 A.M. he was passing red urine, and at 6 P.M. the temperature was 104.2°. The blood showed no parasites. On the 14th he left the hospital much improved in general condition, but without diminution in the size of the spleen.—*Lancet,* Sept. 22, 1906.

GALL-STONES AND GALL-BLADDER DISEASES FROM THE STANDPOINT OF THE PHYSICIAN.

In the course of an article upon this subject contributed to the *Journal of the American Medical Association* of September 22, 1906, BRIDGE asserts that all cases of proven gall-stone or gall-bladder trouble are proper subjects for surgical consideration, whether they are to be regarded as surgical cases or ever come to operation. Whether operation is to be done or not, when conditions do not sound the insistent need of an operation, or the patient declines, or the physician sees reasons against an operation, proper medical treatment should be instituted always, and persistently carried out. This is as true of the gall-stone troubles as it is of those of the appendix.

What are such measures? In the acute cases there should be absolute rest of the body. Rest of the stomach and bowels to the extent of starvation for some days is best, especially when peritonitis is present or threatened. Nutrient enemata may be allowed tentatively, but never nutrition by the stomach in such cases. The upper abdominal organs must be kept still, not shaken about by peristaltic movements. During the initial pain it is always best to evacuate the stomach promptly, and for this purpose an emetic of sulphate of zinc is perhaps better than the stomach-tube, since it tends to relax spasm, and often evacuates food contents that could not pass through a tube. Enemata are best to evacuate the bowels in the acute cases. After starvation begins the bowels accumulate little fecal matter and give little trouble. General measures to sustain the powers of life, as nutrient enemata and perhaps hypodermic injections of strychnine, are always in order after a few days of the starvation. Perhaps there is some benefit to be expected from hot poultices or ice-bags over the epigastrium. It is much to be regretted that our views of the exact effect and value of these measures should not be more settled and unanimous than they are; some of us prize the hot applications, some use the cold, while others deny the value of either.

In the subacute and chronic cases the daily full flushing of the bowels by alkaline laxative waters is useful, but it is irrational to suppose that gall-stones are thus washed away. Nor does olive oil or any other of the pretended expulsive agents have the smallest effect. The thing that happens is probably merely the elimination of effete matter from the body, thus increasing the physiological resisting power. This process is aided by a restricted diet of the most proper foods and by general good hygiene. It is the custom in Europe to send patients with chronic gall-tract diseases to some of the spas (mostly to Carlsbad) for a course of the waters, to see if an operation can be avoided by the appearances of recovery. These measures are all useful, for the patient gets the benefit of an abstemious regimen, for a time at least, in addition to the waters, and thus is frequently able to improve in a marked manner.

To go to the springs, drink freely of water and live on a low diet, be much out-of-doors, and rest from work and perhaps from cares, are always wholesome for these cases. Such a vacation can be taken once or twice a year with great propriety, but it has little power to postpone the day of a final surgical operation or death if on returning home the patient goes back to his former habits of overfeeding, irritation of stomach, lack of depuration, and generally unhygienic life. This latter is just what a large number of patients are constantly doing. By this course they invite infection

from irritating things in their gall-tracts and so hasten surgical intervention. This last is no misfortune if the surgery can be done at the right time and under the best conditions; but they usually regard it as a misfortune, and think they are fighting it off by their occasional water cures.

The only proper course for such patients, who would be fairly well and avoid surgery, is to live lives of absolute regularity and abstemiousness, be rigidly temperate in everything except the use of water, and hygienic and moderate in every day's living. One day of overdoing, overeating, or overdrinking, or of severe chilling of the body, may start an infection and precipitate an acute attack that will destroy life unless prevented by timely surgery.

DISINFECTION BY FORMALDEHYDE.

A valuable contribution to the subject of disinfection by formaldehyde forms the substance of a paper by Mr. Daniel Base, of the Division of Pharmacology, Hygienic Laboratory, United States Public Health and Marine Hospital Service, which is published in the *Journal of the American Chemical Society* for August. The investigation was undertaken in order to determine the amount of formaldehyde gas given off into a room, specially designed for the purpose, from a definite volume of formalin by five well-known methods, and to fix the relative value of these methods as to the yield of formaldehyde gas. The methods compared were: (1) The permanganate-formalin method, by which formalin is poured upon crystals of potassium permanganate; the reaction is completed in about five minutes. (2) The autoclave method, whereby an autoclave is first charged with a definite mixture of formalin, glycerin, calcium chloride, and water; the pressure is then raised to between 50 and 60 pounds, the cock is opened, and the ejection continued until the pressure falls to about 20 pounds; the pressure is then again raised and the process repeated so long as vapor continues to escape from the nozzle of the autoclave. (3) The sheet-spraying method, which simply consists in hanging up in a room two large sheets at an angle of about 45°, dampening them and spraying them uniformly with a given quantity of formalin. (4) The Kühn lamp method, based on the generation of formaldehyde by the partial oxidation of methyl alcohol. (5) The Trenner-Lee retort method, by which formalin is simply heated to the boiling point in a retort in such a manner that the issuing formaldehyde gas and water vapor are passed into the room. The results obtained must be interpreted as representing the quantities of formaldehyde gas that may be expected to be present in a fairly air-tight room on a fairly still day, and after a certain interval of time which varies with the method used.

According to the volume of formaldehyde yielded Mr. Base arranges the methods in the following order: (1) the Trenner-Lee retort method, which gives the best yield; (2) the autoclave method; (3) the permanganate-formalin method, in the proportion of 300 grammes of the salt to 600 cubic centimeters of formalin; (4) the sheet-spraying method; (5) a modification of (3), consisting in the addition of 300 cubic centimeters of water to 375 grammes of potassium permanganate and 600 cubic centimeters of formalin; and (6) the Kühn lamp method.

For simplicity and expedition Mr. Base regards the permanganate-formalin method as preferable to all the others. The yield of formaldehyde gas can easily be increased by using larger quantities of materials. Although the sheet-spraying method does not give at any time so high a percentage of the gas, it has the advantage that a uniform amount of gas is kept up for a long time. On the other hand, the modified permanganate-formalin method yields a constantly diminishing quantity of gas, which after five or six hours is less than is obtained by the sheet-spraying method. By the autoclave method there is a loss of formaldehyde in the autoclave by polymerization or decomposition. The Trenner-Lee retort method, although yielding appreciably more gas than the autoclave, requires more than twice the time to exhaust the apparatus.

With the Kühn lamp the yield of formaldehyde is low; but this method possesses the merit of producing more moisture in the air of the room than the other methods described. This point is of importance, since it has been stated by M. von Brunn and others that it is preferable nearly to saturate the air of the room with moisture in order to favor the condensation of the formaldehyde on the various objects in the room. Mr. Base suggests that a greater degree of humidity in the air can be readily obtained with the permanganate-formalin method by using an ordinary tin or copper still.

Finally, Mr. Base quotes the conclusions of a recent experimenter as to the practical requirements for an effective formaldehyde disinfection: (1) Five grammes of formaldehyde (absolute) should be present in each cubic meter of space (0.1416 gramme per cubic foot), and should be allowed to act for seven hours; (2) the temperature of the room should not fall below 50° F., the best temperature being from 68° to 77° F.; and (3) the strength of the formalin should be ascertained.—*Lancet*, Sept. 29, 1906.

ANGINA PECTORIS.

Gibson writes on this topic in the *Practitioner* for September, 1906. He asserts that the first duty of the physician, when called to see any one suffering from a paroxysm of angina pectoris, is to relieve it with as little delay as possible. Seeing that in the majority of cases the condition is associated with at least a relative high arterial pressure, drugs which lessen the resistance are of great importance. The most useful of these are the nitrites and the iodides. The nitrites of amyl and butyl —more exactly isoamyl and isobutyl—have long had a well-merited vogue for relieving the symptoms. Amyl nitrite is preëminently useful, and when administered in a dose sufficient to produce well-marked physiological effects it cannot be surpassed. Butyl nitrite, although of more recent introduction, and therefore of less assured utility, appears to produce very beneficial effects also. Both may be administered in doses of from three to five minims, the most convenient means of administration being glass capsules. It is difficult, if not impossible, to decide *a priori* the relative utility of these drugs. Their effects are undoubtedly dependent to a greater extent upon personal idiosyncrasies.

Ethyl iodide, otherwise known as hydriodic ether, is also of considerable value, administered by inhalation in doses of five minims; glass capsules containing this dose may be employed. So far as can be ascertained, the action of this drug is due to the liberation of free iodine, which is rapidly absorbed by the blood. It is impossible to foretell in any given case whether the nitrite or iodide series will be most useful, and the value of these drugs can only be judged by their results. It is unfortunate that all of them frequently leave headache and giddiness behind them. A very serviceable combination is supplied in capsules of ethyl iodide and chloroform, each containing five and ten minims respectively of the two drugs. The chloroform has certainly, in the author's experience, lessened the discomfort produced by hydriodic ether.

The exhibition of powerful alcoholic stimulants by the mouth is often urgently called for; brandy, whisky, spirit of ether, spirit of chloroform, and aromatic spirit of ammonia are all eminently useful in this connection. It may even be necessary to give the patient such general anesthetics as chloroform or ether by inhalation. Sometimes the subcutaneous administration of morphine is absolutely necessary. The application of heat to the chest externally is often useful, and respiratory movements certainly alleviate the suffering in many cases. It need hardly be added that the patient must be placed in such a position as will be most easy and comfortable, while an abundant supply of fresh air must be secured. If the sufferer can be induced to inspire deeply, he will often obtain relief.

When we consider preventive treatment, we find it necessary to lay down full directions regarding the general measures to be followed. The diet must be so regulated

as to prevent any digestive embarrassment, particularly flatulent distention; the fluid must be ample, so as to insure proper metabolic changes, but it should not be given with meals; sufficient exercise must be enjoined, so as to stimulate not only the muscles but every other part of the body; adequate rest should be secured, so as to provide for recuperation; occupation must be provided, in order to prevent the mind lingering upon the distressing symptoms of the affection; sleep enough to provide for complete restitution of every system will have to be insured—these general measures will require full attention, and many little details, which cannot be mentioned here, will demand sedulous care.

Respiratory movements cannot be overestimated; their value for those able to take advantage of them is very great. In certain cases, however, when the patient is unable to take active exercise, massage must be adopted. With regard to such matters, it is the author's conviction that the Swedish system of massage and exercises is very much more useful than any other method.

THE NATURE AND TREATMENT OF ANGINA PECTORIS.

In the London *Practitioner* for September, 1906, BARBER has an article bearing this title. He thinks that in a severe attack of angina pectoris, amyl nitrite must be inhaled at once; a capsule, containing three or five minims, should be broken in a handkerchief and the vapor inhaled; if this fails to relieve in a minute or two chloroform may be tried, which is best administered, on a sponge, in a smelling bottle, by the patient himself; and for pain which is persistent, morphine, gr. ¼ hypodermically, is required, which in a feeble patient may be counteracted by the injection of liquor strychninæ hydrochloridi min. iij. At the same time, if at hand, the following stimulant should be taken:

℞ Spiritus ætheris, min. xxx;
Spiritus ammonii aromatici, min. xxx;
Aquæ camphoræ, q. s. ad ℥j.

Or failing that f℥ss of brandy.

As an alternative for amyl nitrite, one or two minims of liquor trinitrini (B. P.) or one or two of the tabellæ trinitrini (B. P.) may be taken. Amyl nitrite usually acts more promptly, but in some cases one of these latter will relieve where amyl nitrite fails. Sodium nitrite, in two-and-a-half-grain tablets, is recommended for pain that is not readily relieved by the above nitrites; the dose is one to four tablets.

Erythrol tetranitrite, one grain in alcoholic solution, is said to be more lasting, and is therefore useful in cases in which there is quick recurrence, and the same may be said, to a less degree, of sodium nitrite. Of other vapors recommended, iodide of ethyl, bromide of ethyl, and pyridine are the most common, and may be tried in intractable cases; the last is most objectionable, and it is not usual to require any of them. In mild cases, or for pain persisting after the attack is much relieved, hot applications to the precordium are often comforting. When the attack is relieved the patient should rest, avoid all exciting causes, and confine himself to a very light diet; probably for the remainder of that day, at any rate, a strict milk diet, and arrowroot, is the best. Alcohol is best avoided, unless absolutely necessary.

When these attacks have been declared, a course of nitrites is often very beneficial; let the patient take:

℞ Liquor trinitrini, min. j;
Tincturæ cardamomi compositi, min. xxx;
Spiritus chloroformi, min. x;
Aquæ, q. s. ad f℥j.

Sig.: Take at one dose when needed.

Professor Osler recommends that the dose should be gradually increased, every five or six days, till headache and flushing are produced. The nitrites may be taken for several weeks; perhaps the most difficult cases are those in which there is a tendency toward failure of compensation of the heart, as the liquor trinitrini may increase this, and the administration of digitalis may bring a return of pain. These patients must be kept in bed or on a couch while the liquor trinitrini is given, and instead of digitalis, caffeine and nux vomica may be used:

℞ Liquor trinitrini, min. j;
Caffeinæ citratis, gr. ij;
Tincturæ nucis vomicæ, min. viij;
Syrupi aurantii, ʒss;
Aquæ, q. s. ad fʒj.
Sig.: Take three times daily.

The diet should be of a light farinaceous character. Eggs lightly boiled and fish may be allowed; but in severe cases peptonized milk, or milk and barley water only, should be taken for a short time.

To Avoid Attacks.—The most important point for the patient who is liable to angina pectoris is the regulation of his life in such a way that he may avoid all forms of exciting cause. The exciting causes are very variable; probably the most common are physical exertion and distention of the stomach, and perhaps emotion should come third. Hurrying for a train, walking fast up-hill, all forms of exertion, especially after food, must be avoided. Mental excitement, business worry, anger, or emotion of any kind may set up an attack. Exposure to cold—bathing, for example—substances that have a toxic action on the heart, as tea, tobacco, coffee, and alcohol, are all exciting causes which must be guarded against. An even, quiet life, free from excitement, with plenty of fresh air, and very gentle exercise, is what is needed; warm clothes in the winter, and for the proper action of the skin warm baths, are required.

The diet should consist of white, boiled fish, eggs lightly boiled, and milk puddings; fresh meat may be allowed, and is best underdone. Plenty of water, or some mineral water, should be taken. Vegetables, and other articles likely to cause flatulence, must be avoided. The meals should be taken regularly, and no supper allowed. The bowels must be kept acting regularly by a so-called "dinner-pill" of aloes and nux vomica; or an occasional dose of calomel, gr. ½ or 1, followed next morning by Carlsbad salts ʒj, may be taken. A digestive tonic may at times be beneficial—for example:

℞ Sodii bicarbonatis, gr. xx;
Tincturæ aurantii, min. xx;
Infusi calumbæ, fʒss;
Aquæ chloroformi, q. s. ad. fʒj.
Sig.: Take three times a day after meals.

Or,

℞ Acidi nitrohydrochlorici diluti, min. x;
Tincturæ nucis vomicæ, min. viij;
Tincturæ aurantii, min. xx;
Aquæ, q. s. ad fʒj.
Sig.: Take three times a day after meals.

Of drugs which may have a curative action, potassium iodide, in large doses (gr. x to xx, t. d. s.), is very strongly recommended by Sir Lauder Brunton in arterial degeneration. It is administered, of course, freely diluted with water, to prevent iodism, and its effect must be carefully watched. Arsenic and strychnine combined have given benefit in some cases:

℞ Liquor strychninæ hydrochloridi, min. iij.
Liquor arseni hydrochloridi, min. iij;
Tincturæ aurantii, min. xx;
Aquæ, q. s. ad fʒj.
Sig.: Take three times a day after meals.

Potassium bromide, in neurotic cases, is very beneficial and may be added to the alkaline digestive tonic prescribed above. Where both anemia and valvular disease of the heart are present, digitalis and iron may well be combined:

℞ Tincturæ digitalis, min. x;
Liquor ferri perchloridi, min. xv;
Acidi citrici, gr. v;
Syrupi limonis, min. xxx;
Aquæ destillatæ, q. s. ad fʒj.
S.: Take three times a day after meals.

It must be remembered that digitalis may increase the pain, and if arterial tension is high, caffeine citrate and nux vomica will be better. It has been stated that cocaine will prevent the occurrence of angina pectoris, but probably it is not a safe remedy.

In some cases, in which there have been premonitory symptoms, the application of the constant electrical current over the vagus in the neck has effectually warded off the attacks.

For the treatment of the other varieties of pain, not true angina, the main indication would be to avoid the poison in toxic angina; to give general tonic treatment and bromide of potassium in pseudoangina; and rest, with sometimes nitrites, in valvular disease of the heart. In all these cases the diet will require careful regulating. The treatment of angina, associated with an

aortic aneurism, or aortic regurgitation from atheroma of the valves, requires no special comment, though the prognosis is more grave.

The great essentials, then, in the treatment of angina pectoris are a quiet life, a wise diet, and the administration of nitrites in an attack. A patient subject to angina should carry amyl nitrite capsules, or the tabellæ trinitrini.

THE TREATMENT OF TETANUS.

For many years the treatment of tetanus has aroused the interest both of the practicing physician and of the experimenter. A disease of strikingly definite character produced by an organism or its products which is known offers a field for study which undoubtedly in time will be crowned with success from the standpoint of treatment. An interesting, concise discussion of the general subject from a somewhat new point of view appears in the current number of *Surgery, Gynecology, and Obstetrics,* by Dr. C. A. Porter, of Boston, being a paper read at the last meeting of the American Surgical Association.

Our present knowledge of the action of tetanus toxin is essentially as follows: Diffused from the local lesion the toxin enters the motor nerve plates of the muscles and passes thence within the axons of motor nerves toward the motor ganglia in the cord. The toxin also enters the general blood current, whence it is either excreted or destroyed, or indirectly conveyed again to the nerve structures. The poison shows a strong tendency to enter into combination with the higher central ganglia, and on this fact is based the possibility of a rational treatment. The fact should also be recognized that antitoxin ascends the axons more slowly than the toxin, and therefore it must be introduced at a higher level than the toxin, and before stable union between nerve and toxin has occurred. Dr. Porter on the basis of these generally accepted principles finds the following indications for treatment: (1) To anticipate the centripetal course of the toxin by an immunizing injection at a higher level; (2) by local injections of antitoxin, to neutralize the toxin at its upper limit of advance; (3) by intravenous or subcutaneous injections, to neutralize all circulating toxins; (4) to prevent or retard, so far as possible, lymphatic absorption from the focus, and by local parenchymatous injections to render the poison inert; (5) by amputation or excision, with germicides, etc., to remove the source of infection when it is possible; and (6) by symptomatic treatment or the newer anesthetic treatment, cocaine, etc., or magnesium sulphate, to aid the specific serum.

Dr. Porter contends that if the view be true that antitoxin never reaches nerve tissue unless directly injected into it, it follows that cerebrospinal lymph sac injections are useless. Lumbar puncture and subarachnoid injections are presumably inefficacious, and the direct injection of the antitoxin into the cord is obviously too dangerous a proceeding to be attempted except in the most desperate cases.

The suggestion is made that injections might be made into the higher peripheral motor nerves, as, for example, the hypoglossal nerves and the brachial plexuses. This would be a far less dangerous procedure than injections into the substance of the cord. The surgical difficulties are relatively slight, and inasmuch as injections are indicated as near to the cord as possible the nerves should be exposed near their origin and their substance directly injected. As a still more radical procedure it is suggested that in certain cases nerves should actually be sectioned to prevent the passage upward of tetanotoxin. The general treatment suggested is summarized as follows:

1. Immediate intravenous and subcutaneous injections to neutralize circulating toxin.

2. Immunizing or neutralizing injections at the highest level which the severity of the symptoms appears to justify; directly into the cord, as advocated by Rogers, or into the higher motor nerves, such as the hypoglossal and spinal accessory, as suggested by the author.

3. Peripheral intraneural injections as near to the cord as possible. Where amputation is not indicated or allowed, there is positive experimental evidence that nerve section will isolate the toxins in the limb.

4. Lymphatic absorption will be diminished by the application of Bier's principle of passive hyperemia or by circumcision of the limb.

5. Parenchymatous injections, especially into the muscles, may be found of distinct value in addition to subcutaneous and intravenous injections.

6. If possible, the local focus should be thoroughly eradicated.

7. We have no right to neglect symptomatic treatment.

8. Animal experimentation gives us no ground for hoping that any treatment whatever can be successful, when once the disease has progressed beyond a certain stage.

The foregoing opinions of Dr. Porter on the basis of a careful study of the literature are highly suggestive and indicate an apparently rational mode of treatment which has hitherto been overlooked. Unfortunately Dr. Porter is unable to substantiate his claims at the present time by an array of cases from which the ultimate test must naturally come. The means of treatment, however, apart possibly from the somewhat radical sectioning of nerves, is one which may be tried without danger, and which certainly should receive the careful consideration of those into whose hands cases of tetanus may come.—*Boston Medical and Surgical Journal,* Sept. 6, 1906.

METHYLENE BLUE IN THE TREATMENT OF INOPERABLE CANCER.

Dr. A. Jacobi, of New York, in a discussion before the Medical Society of the State of New York, January 30, 1906, said that all physicians, no doubt, were called upon sometimes to treat inoperable cancer. His experience ran back fourteen or fifteen years and involved a large number of cases which the surgeon would not touch. These patients, he said, could be made comfortable, and some might be restored, at least temporarily, to a certain amount of health and efficiency by internal treatment. Fourteen or fifteen years ago Moorhof-Mosetig in Vienna recommended the use of aniline dye, methylene blue, in inoperable cancers. At that time it was used subcutaneously. In America, Dr. Willy Meyer was, Dr. Jacobi believed, the first to write on this subject. Dr. Jacobi said this method of using it was very painful, and therefore but little success attended its use. Later he had used methylene blue internally. When he had to treat an inoperable cancer, particularly of abdominal organs, or in cases in which operation had been refused, he gave methylene blue, in pill form, a half grain four times daily in the beginning, and increasing up to four, five, and six grains a day. From the very beginning, in order to counteract the disagreeable dysuria, he gave extract of belladonna, three-fourths of a grain a day, divided into three or four doses. It acts very much better than nutmeg, which has been recommended for that purpose. Under such treatment the cases have done well, particularly the intra-abdominal cancers. In cases of cancer of the liver, after using this treatment for some time, he has seen autopsies performed, and the tumor found to have been much reduced, the patient having lived for a good many years in tolerable comfort. He had had one case under observation eight years: this patient is now attending to his business all the time. He would recommend this treatment, too, in cases that have been operated upon, as a routine measure. This plan of treatment he brought before the society because there are so many of these cases. Frequently he has combined the methylene blue with arsenous acid, a preparation which he considers better than Fowler's solution. It could also be given with strychnine, or anything one pleased. It is important that the pills should be made up by a good apothecary. The dosage of the methylene blue should be gradually increased from two up to six grains daily, and even more, divided into four doses.—*New York State Journal of Medicine,* September, 1906.

SERUM TREATMENT OF TUBERCULOSIS OF THE BLADDER.

The experiences reported by KEERSMAECKER (*Annales des Maladies des Organes Génito-urinaires,* No. 13) were in women of early adult life of the poorer classes. He found that no treatment, either local or internal, had any influence on the tubercular lesions, although a mixed infection could be gotten rid of by the usual antiseptics. After using the "filtered bouillon" of Professor Denys he has cured a series of cases. He begins with a 1:1000 and increases to 1:100 and 1:10. He reports twelve cases: three of vesical lesions only were cured, two of renal alone were greatly improved, and of seven cases with lesions of the bladder and kidneys, five were cured or almost so at present.

PRIMARY SARCOMA OF THE STOMACH.

M'CORMICK and WELSH (*Scottish Medical and Surgical Journal,* October, 1906) report two instances of primary sarcoma of the stomach—both successfully operated on, both over fifty years of age.

A third case is appended, occurring in a man forty years old, the diagnosis having been made post mortem. Authorities are quoted to the effect that more cases of primary gastric sarcoma are reported over seventy than under ten years of age, and there are just as many between the fiftieth and seventieth as between ten and thirty, the maximum incidence falling between the fortieth and fiftieth year. They state that the perfunctory classification of malignant growths as sarcomata when they arise in the young, and as cancers when they arise in later life, is a convention much to be deprecated.

The round-cell forms frequently spread in the pyloric half of the stomach, and frequently manifest themselves as diffuse infiltrations of the stomach wall. There is usually no stenosis of the pylorus, the orifice being kept open by the rigidity of the walls, but the cardiac end is often dilated. The bulk of the growth is encountered in submucous tissue. This form of growth rarely gives rise to a globular tumor projecting from the stomach wall. The general symptoms are like those of carcinoma in the same region, and the chemism is modified in the same way. The disease is fairly rapid in its course and there is a tendency to glandular infection.

Spindle-cell sarcomas generally spring from the body of the stomach near the greater curvature, and often from its posterior wall. They take the form of localized growths which project from the outer surface of the stomach. As they increase in size they frequently become pedunculated. They form adhesions with adjacent structures. These forms display a relatively limited malignancy, though secondary growths have been recorded, particularly in the liver. Stomach symptoms are characteristically absent in the early stages. Even later when a firm, rounded, freely movable tumor can be felt there may be nothing in the clinical history to attract attention to the stomach. The majority of successful operations have been accomplished in regard to the growths of the spindle-cell group.

VALUE OF INDIGO-CARMINE TEST AS AN AID IN THE DIAGNOSIS OF PARTIAL AND TOTAL URETERAL OCCLUSIONS.

BEER (*Annals of Surgery,* October, 1906) sees in the hypodermic administration of indican-carmine in sterile aqueous solution a most valuable aid in the diagnosis of ureteral obstruction, holding that the cystoscopic study of the behavior of the ureteral orifices does not suffice for the formation of a diagnosis even when combined with ureteral catheterization, and that these two means of exploration combined with the indigo-carmine test give conclusive evidence.

Illustrative cases are cited showing how apparently complete obstruction of the ureter did not exist after injection of 30 minims of a concentrated aqueous indigo-carmine solution and cystoscopic examination.

PERFORATIVE GASTRIC AND DUODENAL ULCER.

MILES (*Edinburgh Medical Journal*, September, 1906) reports 36 cases of perforative gastric ulcer and 10 of perforative duodenal ulcer, with a mortality in each series of 50 per cent. Of 19 cases operated on within twelve hours of perforation, over 74 per cent recovered, whilst of 12 operated on in less than thirty-six hours after perforation 8 per cent recovered. Several of the patients were obviously moribund and were only operated upon for what seemed to be the last remaining chance. An occasional case justifies this course. The younger the patient the better the prognosis. Usually there is a previous history of severe indigestion, and in a considerable number of ulceration of the stomach or duodenum. Hematemesis is a rare antecedent symptom. Occasionally perforation occurs in patients who have never hitherto suffered from any digestive disturbance. Symptoms premonitory of perforation are often present. The gastric perforations are usually in the anterior wall. There was a single case of multiple perforation. The most characteristic clinical features were the suddenness of onset and overpowering nature of pain, the marked abdominal rigidity, and the severe degree of shock. Vomiting was not unusually severe at the onset. The persistence of normal hepatic dulness does not negative a diagnosis of perforation. The seat of the greatest area of pain and of tenderness to pressure forms a reliable guide to the seat of the perforation, and therefore to the site of the incision.

The apparent improvement which accompanies the reaction from the initial shock is very deceptive, and apparently the administration of opium adds to the danger, since in 22 cases in which no opium was given 5 patients died and 17 recovered, and in 12 cases in which opium was given 10 patients died and 2 recovered. There is no constant relation traceable between the severity of the peritonitis which ensues and the size or site of the perforation, the quantity or quality of the fluid which escapes from the stomach, the state of repletion of the stomach at the moment of perforation, or any other single factor. Food particles are very seldom recognizable in fluid found in the peritoneal cavity. The abdomen should be opened as soon as possible by a vertical incision, passing between the fibers of the rectus, and usually placed over the site of maximum tenderness.

It is almost never necessary to open the stomach to find the perforation. The suture of the stomach should be reënforced by an omental graft. Leakage is extremely rare. If closure of the ulcer has actually resulted in serious narrowing of the pylorus, gastroenterostomy should be performed. Pyloroplasty in place of gastroenterostomy is in certain cases a simple and efficient alternative. Usually the abdomen should be washed out, a special opening being made above the pubis for the purification of the pelvis and for purposes of drainage. To favor the latter the head of the bed should be raised. The complications encountered by Miles have been temporary gastric fistula, pneumonia, bronchitis, acute non-suppurative parotitis, phlebitis of the leg, pelvic abscess, subphrenic abscess.

ABDOMINAL TUMORS IN CHILDREN.

FISCHER (*American Journal of Surgery*, November, 1906) states that the large proportion of abdominal tumors in early life arise from developmental aberrations. Most malignant growths in early life are sarcomatous. There is a growing tendency to attribute them to traumatism. Certainly some of the kidney sarcomata are congenital. The abdomen seems to be the most frequent location for malignant tumors in children, and usually sarcoma of the kidney. Next in frequency tumors affecting the ovaries and testicles are noted in children, usually before the fifth year. Of thirty-six cases of tumor of the suprarenal body collected by Williams one-third occurred in childhood and were invariably sarcomatous. They may occur in very early infancy. Uterine cancer is rare before the age of twenty.

Lebert and Guersant have both reported a case of epithelioma of the introitus of a girl three and a half years old. Malignant neoplasm of the ovary occurs in infants and young children. In twelve cases operated on by Aldibert, six were children between seven and nine and one only four years old. Malignant disease of the gastro-intestinal tract is very rare in early life. Round-cell sarcoma of the liver has been reported in infants a few times. Many times the tumors are recognized only post mortem. As to general systemic disturbance, often lienteric diarrhea, sometimes constipation, sometimes swelling of lymph glands, usually marked pallor and anemia, are recorded. Hematuria is occasionally noted. Symptoms due to compression are edema of the lungs and scrotum and dilatation of the superficial abdominal veins. At times jaundice, marked leucocytosis, or iodophilia are helpful signs.

KIDNEY AND COLON SUSPENSION BY THE USE OF THE NEPHROCOLIC LIGAMENT AND GEROTA'S NEPHROCOLOPEXY CAPSULE.

Longyear (*American Journal of Obstetrics,* November, 1906) presents a further communication upon the mechanics of kidney displacement. He states that the nephrocolic ligament is formed by an aggregation of fine reticuli originating in and identical with the fibrous tissue forming the framework of the fatty capsule of the kidney, which after enveloping this organ pass downward and are inserted into the posterior wall of the ascending colon on the right side and the descending colon on the left side. He compares it in structure as well as in action to a network covering a balloon (the kidney), the cords of which extend downward to support the car (the cecum). The descent of the kidney is dependent on the laxity of its support and the degree of traction exerted upon it by the cecum. The nephrocolic ligament is a firm and unyielding attachment which is drawn in a downward direction by the cecum, particularly when it is distended with fecal matter and is making violent efforts to unload itself. The action of the colon on the left side is in the opposite direction, as the contents there are forced downward, hence the left kidney is rarely pulled out of its normal position. The downward descent of the right kidney is increased by the pulling of the ascending colon, carrying with it the duodenum, by reason of the adhesion of this intestine to the side of the fatty capsule. This action by causing a kink in the bowel explains the presence of digestive symptoms in cases of prolapse of the right kidney. Prolapse of the left kidney gives practically no symptoms. The nephrocolic ligament is fuller and stronger in cases of nephroptosis of long standing, probably being the result of the long-continued traction to which it has been subjected. The ligament of the left side, though similarly placed, is not so uniformly strong as on the right.

The author's operation, performed ten times, comprises the following steps: An incision two and one-half to three inches long, beginning just outside the quadratus lumborum muscle, at the twelfth rib, and passing diagonally downward toward the ilium, through skin, fat, and superficial aponeurosis to the latissimus dorsi muscle; blunt dissection through the muscle parallel with its fibers; incision and isolation of the transversalis fascia by rat-tooth forceps, one on each side; pushing downward subperitoneal fat; incision of Gerota's capsule and isolation of its edges by tissue forceps, one on each side; grasping and raising nephrocolic ligament with long rat-tooth forceps, directed by the finger against the lower pole of the kidney; gathering up of ligament with blunt hook forceps, passed around it forward of the rat-tooth forceps; liberation of loop of ligament from the peritoneum by opening forceps, drawing through margins of Gerota's capsule, overlapping and suturing under loop of ligament; closing transversalis fascia, with loop of ligament sewed into upper angle, close to twelfth rib, closing balance of wound. The patients were kept in bed three weeks, and for suture material No. 2 chromicized catgut was used.

An abdominal band, with a thick pad

placed below the navel, was applied at the time of operation, and the patient was instructed to wear this for three months.

Longyear states that Gerota's capsule is easily isolated in the upper angle of the wound, after pushing down the superimposed subperitoneal fat. It is pink in color, thin and tough, and somewhat resembles peritoneum. It should be sought for in the upper angle of the wound, as it will often be missed in the lower angle and the peritoneum incised instead. In uncomplicated cases there is no necessity for opening the peritoneal cavity, as the identification and opening of Gerota's capsule render the nephrocolic ligament easy of access.

The advantages of the operation are the slight mutilation of the parts, the holding of the kidney in a natural, partially movable, manner, allowing of the necessary limited motion which prevents its farther traction on both the duodenum and kidney. A detailed report of the ten cases is given, the first of which was operated on January 8, 1906. The results do not differ greatly from those which follow the usual operation. Nor are the technique and mechanics, as quoted from the author, easily understood.

SPLENECTOMY AND BANTI'S DISEASE.

ARMSTRONG (*British Medical Journal*, Nov. 10, 1906) reports a case of splenectomy performed on a man twenty-six years old, who at the age of eighteen and again at twenty had a slight attack of catarrhal jaundice. A year later, following trauma, he vomited dark material which may have been blood. This was followed by firm enlargement of the spleen, which became steadily progressive. Splenectomy was performed about six years after the accident with a successful result. The author has collected thirty-two cases, including his own, with twenty-three recoveries and nine deaths. The disease seems the most common between the tenth and fortieth years. The average weight of the spleen was four pounds two ounces. When the patients recover they seem to be practically restored to health. Several cases were reported well after upward of six years from operation. It is noted that the frequent bleeding attacks to which these patients are subject cease. In this disease the splenic veins are extremely dilated, together with their contributory branches. Parts of the wall are thickened. In the majority of cases hematemesis has been a frequent and troublesome symptom, sometimes associated with melena. The sequence of events seems to be first enlargement of the spleen, which may precede by years any definite recognizable alteration in the blood. The dilated condition of the vasa brevia commonly observed in Banti's disease, and sometimes associated with esophageal varix, points to an obstruction to the passage of the blood through these vessels, and it is probable that this hematemesis is due to this obstruction, since 40 per cent of the blood in the stomach passes by the vasa brevia to the splenic vein. It is suggested that the primary lesion may be in the veins and that the splenic enlargement is secondary to the long-continued passive hyperemia, and that the poison or poisons causing the subsequent alteration in the blood and changes in the liver are characteristic of the third and last stages of the disease, since the disease is essentially and without exception progressive and tends ultimately to destroy life, excepting as when treated surgically splenectomy is indicated, particularly from the fact that it is followed by an immediate improvement even in advanced cases. The sooner the operation is undertaken the better. Since death from hemorrhage is the major danger the technique should afford perfect access for the control of bleeding. A vertical incision along the outer border of the left rectus, extending from the costal border downward as far as may be required, and joined by one at right angles to the first, and extending well to the left loin, enables the surgeon to deal safely with any adhesions on the outer surface of the spleen, and between it and the diaphragm, as well as the vessels of the pedicle. Special care should be taken to arrest all hemorrhage from the vasa brevia and from the vessels contained in the lienophrenic ligament.

THE TREATMENT OF PROSTATIC ENLARGEMENT.

In a discussion on this subject (*British Medical Journal,* Nov. 10, 1906) THOMAS holds that there is no choice between the suprapubic and perineal routes so far as the mortality is concerned; that either may be followed by disappointing results, such as stricture of the urethra, fistula, and interference with sexual function, and that the prospects of recovery are about 14 per cent in favor of the suprapubic route; that in bad septic cases the operation should be done in two stages—the suprapubic is more suitable for tumors of the middle lobe, for removal of calculi, and the control of hemorrhage when they coexist; that the suprapubic route is unsuitable for surgeons with short fingers or with flexible, thin nails; that post-mortem evidence of cases in which the prostate had been removed shows that anatomically it is not possible to remove the prostate in one mass without also removing the prostatic urethra.

FRACTURE DISLOCATION OF THE SPINE.

WELFORD (*British Medical Journal,* Nov. 10, 1906) reports the case of an engineer thirty-eight years old, who sustained a fracture dislocation at the junction of the tenth and eleventh dorsal vertebræ, for which he received postural treatment in the hospital. Two years later he came under the reporter's care, who noted motor and sensory paralysis of both legs, priapism, incontinence of urine and feces, and cystitis. Laminectomy was performed and showed a prominent piece of bone projecting backward into the canal from the body of the tenth dorsal vertebra. This was snipped off piecemeal, after which the dura was opened, showing a normal cord. A probe which was passed up and down beneath the dura for two inches met with no obstruction. The opening in the dura was closed with catgut and the wound drained for forty-eight hours. A plaster jacket was applied. The patient was immediately relieved from pain and was able to locate finger-touch within one inch, as far down as the pubes and on the inner surface of both thighs. Sixteen days after operation he could move the great toe of his left foot, could use crutches, and throw the left leg far enough ahead to take a step. There was no appreciable improvement in the right leg.

The second case was that of a man sixty years old, who suffered from fracture dislocation of the fourth cervical vertebra. He had complete motor and sensory paralysis of the upper and lower extremities. The pupils were contracted; the face, neck, and chest were of a purple color and bathed in perspiration. Respiration was very shallow and entirely diaphragmatic. Temperature was 104°.

Laminectomy was done forty-eight hours after the injury. There was complete bilateral dislocation forward of the fourth cervical vertebra, and a fragment of detached bone half an inch long lay across the cord. Reduction was easily effected by hooking an aneurism needle up under the posterior arch of the fourth vertebra and making gentle traction, but as it would not remain in the reduced position the transverse processes of the fourth and fifth vertebræ were wired together on both sides. Chloroform was not given. He regained the use of both arms and legs immediately, and talked incessantly, complaining of the pain he had experienced in his neck during the operation. He, however, died at the end of fifty-two hours, showing meningeal and pneumonic symptoms, with a temperature of 108° F.

THE TREND OF THE TIMES IN APPENDICECTOMY.

Under this title SCOTT (*American Journal of Obstetrics,* November, 1906) states that operation approaches the ideal in proportion to its elimination of time, pain, and danger.

Ether and chloroform, he holds, are often followed not only by the expected discomfort but by disastrous results. In his own experience with nitrous oxide and oxygen, now extending over a period of six years, accidents did not occur. So slight are the

after-effects that after minor operations patients within an hour or so can walk home without discomfort. The incision should be just large enough to give access to the field of operation. The extent of the skin incision is of no importance excepting for cosmetic effect; if the patient is fleshy this superficial cut may, of necessity, be a long one. In aseptic cases the fascial separation should be only sufficient to admit the tip of the index-finger; this is crowded through the soft parts, which are easily dilated to admit the entire length of the finger. Ordinarily the anterior border of the liver, lower pole of the kidney, ascending colon, ileum, and, in women, fundus and right tube and ovary can be palpated. The appendix is located, its condition noted, also the presence or absence of adhesions. If movable, the appendix is brought up to the incision by hooking around it the finger, which is then withdrawn; the wound is held open by a pair of retractors, the omentum pushed through the opening, and the appendix removed by any desired method.

Scott notes that though it is probably unnecessary, it has been his habit, as an extra-precautionary measure, to close the peritoneum with one stitch and secure the overlapped fascia with one more. After operation, if the condition justify this, the patient is given more liberty than is ordinarily deemed advisable. Water and other liquids are given earlier and in quantities sufficient to satisfy. The stay in bed is usually from two days to a week. There are patients who experience great relief from a sitting posture within a few hours of the operation. This is especially true of the obese and of persons possessing a sensitive alimentary canal. Some cannot unassisted evacuate either bladder or bowels in a recumbent position. One such took a step or two several times during the evening, although the operation had taken place a little after noon of the same day.

One ideal recovery was back in his office at work four days after operation. One walked up-stairs at the close of the third day, and entertained guests a few hours later.

ABDOMINAL SECTION FOR TRAUMA OF THE UTERUS.

CONGDON (*American Journal of Obstetrics,* November, 1906) reports the case of a multipara, thirty-nine years old, who because of vague abdominal pain and discomfort had her uterus dilated and curetted by her attending physician. He thinking that he felt some growth foreign to the uterine cavity, grasped it, made traction, and twisted. When it gave way and was removed he discovered that he had 40.5 centimeters of small intestine. The patient was immediately brought to the hospital in a condition of shock, with subnormal temperature, and a pulse of 140.

Congdon opened the belly, finding it full of fresh blood. There were two lacerations of the uterus, one through the fundus extending from tube to tube, the second through the uterus and broad ligament on the left side; they were both bleeding freely. A suture checked this hemorrhage completely, and 40.5 centimeters of the ileum was found missing, beginning at the ileocecal valve and extending upward. Hemorrhage from the mesentery had ceased, in spite of the laceration of large vessels. The opening of the ileocecal valve was closed, and ileocolostomy was performed by means of a Murphy button. The patient made an uninterrupted recovery.

As a result of his study of these cases Congdon notes that in 70 cases of rupture in which no operative treatment was undertaken the mortality was 31 from hemorrhage, 18 from sepsis; a total mortality of 70 per cent. As contrasted with this the recoveries from uterine rupture during labor, complicated by intestinal prolapse, whether treated by abdominal section or, in appropriate cases, by simple reposition, amounted to almost exactly 70 per cent.

He states that the accident under discussion—*i.e.*, rupture of the uterus—may occur in medical practice even in the hands of careful and conscientious men, and believes that if this be recognized and no attempt made at concealment after such an accident, if it occurs in the hands of the inexperienced, the mortality need not exceed 50 per

cent, and will probably be less than 10 per cent. Aside from immediate hemorrhage, previous depletion of strength, as in prolonged labor, and occasional implantation of septic germs in the peritoneum, the mortality of promptly and appropriately treated cases should be reduced to the one or two per cent practically inevitable for major operations.

SOME POINTS IN THE DIAGNOSIS AND TREATMENT OF ACCIDENTAL HEMORRHAGE.

WRIGHT (*American Journal of Obstetrics and Diseases of Women and Children,* November, 1906) holds that the diagnosis in many cases of concealed accidental hemorrhage is generally difficult and sometimes impossible before delivery, since the important symptoms—*i.e.,* anemia and distention of the uterus—are not present in such cases. The immediate symptoms are usually embraced in the term shock from traumatism, and not collapse from loss of blood.

When the hemorrhage is both internal and external the diagnosis is most readily made, but the effect of the blood within the uterus is often difficult to ascertain. Even in such cases the shock from traumatism is often the predominating element, though exceptionally collapse from loss of blood, whether retained within the uterus or flowing externally, may be an important factor. In all cases in which shock is the main condition or the predominating element, the treatment of shock is the one of greatest urgency. In most cases of combined internal and external hemorrhage the introduction of the vaginal plug, with the application of an abdominal binder, appears to be a very safe and effectual plan of treatment.

In a small proportion of cases, especially during labor, puncture of the membrane is beneficial. Any form of forced delivery which includes rapid dilatation of a rigid cervix is unjustifiable. The best operative procedure would appear to be some form of vaginal section, but the field for this is limited and not accurately defined.

ENLARGED PROSTATE—NEW OPERATION.

The modification recommended by CATHELIN (*Annales des Maladies des Organes Génito-urinaires,* No. 17, 1906), but not original with him, consists in the introduction of a finger into the bladder through a small suprapubic opening, to serve as a guide to the operator, who removes the gland *en bloc,* through the perineum.

The patient is placed in the sacrovertical position, the operator stands. A grooved catheter is introduced and the bladder emptied and inflated with air. The skin and bladder wall are then cut through above the pubis. The incision is large enough to admit the finger, and is kept open by an instrument which serves as a guide for the finger. A transverse perineal incision is made in front of the rectum. The left index-finger is introduced suprapubically, not for the purpose of pushing the gland downward, but to serve as a guide in its enucleation against wounding of the vesical mucosa. The right index-finger makes a subfascial enucleation, aided by tenacula forceps and hooked retractor, finally freeing the retropubic lobule till the gland is held only by the urethra; the seminal vesicles and vasa deferentia being visible. The urethra being exposed by the finger is cut across in two places in the prostatic portion and the gland removed in one piece. A gauze drain is placed in the bladder, and after a few days a catheter is introduced and kept in place until the perineum is closed. The suprapubic opening is closed by a gauze pad.

INTESTINAL OBSTRUCTION DUE TO GALL-STONES.

PORTER (*American Journal of Obstetrics,* November, 1906) reports two cases and makes some valuable comments on the question of diagnosis, the main points of which he tells us are as follows:

A previous history of gall-stone disease, often called by the patient "stomach trouble."

Incompleteness of the obstruction.

Relative absence of tenderness, tympany, rigidity, and fever symptoms, especially early in the history of the case.

Persistent and frequent vomiting.

Tumor in the gall-bladder region preceding the symptoms of obstruction, but not present with them.

A migratory tumor, especially if it happens first in the gall-bladder region.

A tumor, even though stationary, of characteristic size, shape, and consistency—*i.e.*, the size of a small egg, oval and hard. However, the best way to make the diagnosis is by opening the belly. Although in many cases of obstruction spontaneous recovery has followed passage of the stones and operation, the mortality remains high. Mayo Robson states that 52 per cent of all cases treated medically die, and that surgery has not shown a much greater percentage of recoveries. Treves places the mortality at even a higher figure.

ARTERIAL VENOUS ANEURISM OF THE NECK.

YOUNG (*Glasgow Medical Journal,* November, 1906) presented at the Glasgow Medico-Chirurgical Society last April two patients wounded in the Boer war, one presenting an aneurismal varix, the other a varicose aneurism. By aneurismal varix is meant a condition in which a large artery communicates more or less directly with a vein, the venous branches and trunk under the influence of the arterial pressure becoming dilated and pulsatile. Varicose aneurism is a lesion in which the opening between the artery and vein is less direct, some sort of sac existing between and around them made up of fibrous tissue or altered clot.

The first case was shot through the upper part of the thorax, but was not operated on. Five years later he was working at his trade, that of an arc lamp trimmer, exhibiting a right pupil somewhat enlarged; no machinery murmur; some evidence of aneurismal enlargement about the junction of the innominate with right subclavian, a slight disproportionate distention of the right superficial jugular vein. This man immediately after his injury, a bullet having passed through his right thorax, showed fulness over an area roughly circular and 2½ inches in diameter, of which the right sternoclavicular joint was the center; faint pulsation palpable over this area, also a strongly-marked thrill; a loud systolic bruit audible in the same region; no pain or dyspnea. A few days later a typical machinery murmur was transmitted along both carotid and subclavian arteries. The cure under conservative treatment was apparently complete.

The second case, also wounded by a Mauser bullet, which passed into the center of the right supraspinous fossa and out between the heads of the right sternomastoid muscle, three-quarters of an inch above the clavicle, at a range of about 300 yards, suffered from hemoptysis and dysphagia for two days. Diminished right radial pulse, enlarged right pupil, pulsating swelling extending 1½ inches upward beneath the right sternomastoid muscle and 2 inches downward from the right intercostal space, and from the middle line of the neck back to the center of the right posterior triangle. The swelling was soft and yielding and with the wide-spread purring thrill palpable for some distance into the distal vessels, especially in the line and course of the right anterior jugular vein; thrill very superficial and easily extinguished by local pressure; felt readily in posterior triangle, but impalpable in the suprasternal notch. Machinery murmur was audible over swelling and over almost the whole of the thorax, also distally as far as the temporal, and the brachial at the bend of the elbow. Five years later found him working with a delivery wagon, but not lifting heavy weights. Was short of breath on exertion and troubled by palpitation. The heart was enlarged; there was a systolic aneurismal bruit, which became more and more apparent as the stethoscope was carried nearer to the base and over the sternum in the direction of the aneurismal swelling. It was heard at its maximum intensity over the clavicle at its inner end, and was con-

veyed well up the neck and as far as the brachial at the bend of the elbow. There was no purring thrill nor evidence of machinery murmur. The radial pulsations were not different in strength and rhythm. Tumor was distinctly obvious, its lower edge seeming to pass behind the clavicle. It was given a bilobed appearance by the sternomastoid muscle passing over it. Pulsation was palpable and visible. A still later report showed further improvement, in that the swelling had diminished and the purring thrill and machinery murmur had disappeared.

The method of treatment for such cases advocated by Silverstone is ligature of artery alone above and below the communication with the vein. This in the case of the vessels of the neck would be an extremely difficult procedure, since exposure of the aneurism has been shown by experience to be attended by very substantial risks. Direct or local ligation must in this region be departed from in favor of simple proximal ligation of the artery. In the first two cases recorded by Makins this was the treatment adopted for arteriovenous aneurism of the carotid, and the results fully justified its adoption, for in the one case all trace of aneurism had disappeared in the patient examined in 1904, and in the other the patient was able to report himself in 1905 as well enough to go out hunting, and to be able to sustain a good fall without ill effects.

THE TREATMENT OF EFFUSIONS INTO THE KNEE-JOINT DUE TO CONTUSIONS OR SPRAIN.

THOORIS (*Archives de Médecine et de Pharmacie Militaires,* No. 11, 1906) on the basis of a very large military experience holds that the two cardinal signs of traumatic effusion into the knee-joint, aside from the swelling, are local increase of temperature over the point of injury and impaired function of the femoral quadriceps. The point of rupture is determined first by palpation, which should be deep, and exercise by the thumb. This will elicit of course tenderness at the point of impact in the case of contusion. A surface thermometer applied to this point and to the corresponding area of the sound knee showed a difference of from a few tenths to 4°, and is proportionate to the degree of injury. This point of tenderness and the high temperature is usually in the inner lateral region of the knee. It is partly because the internal condyle is more exposed to trauma in the case of sprain, because this portion of the bone extends lower than the outer condyle, producing to some degree a genu valgum which may be readily accentuated by violence. The function of the femoral quadriceps is gauged as follows: The patella is grasped firmly between the thumb and index-finger from above and below, the leg lying flat and thoroughly relaxed. The patient is then directed to contract with all his power the quadriceps muscle. If this be perfectly healthy the patella is suddenly and completely snatched from the grip of the thumb and finger. Loss of power is shown by the slowness of contracture and the incompleteness of escape of the patella. This sign precedes the atrophy so common after joint inflammation. It may even precede effusion into the joint. As to the effusion, it is usually of blood and apparently very rapidly absorbed.

Compression and immobilization are considered the worst possible treatment for these cases—the former because the blood is forced out of the patellar cul-de-sac, from which it is most readily absorbed, and because it hastens muscular atrophy, the complication most to be feared. This in turn prevents a perfect joint coaptation and produces a condition which in engineering construction is termed "hammering"—*i.e.,* on each motion there is a jar which implies a slight trauma, and which indefinitely keeps up a condition of inflammation. The same chronic irritation may be kept up by an undue dragging upon the ligaments. Immobilization is held to encourage the formation of a fibrinous deposit, which indefinitely retards absorption. The objection to puncture is that the results are not as satisfactory as those secured by other methods.

As to what the author calls the kinetic

treatment, this is carried out as follows: For forty-eight hours following the accident, this being the period necessary for the effusion to attain its maximum, the knee is slightly flexed over a pillow. Thereafter the leg is elevated by lifting the heel until the thigh makes a right angle with the plane of the bed. This allows the contents of the joint to flow into the suprapatellar pouch, from which reabsorption is rapid. This treatment should be supplemented by passive congestion used according to the Bier method, and by massage, this treatment being applied with the leg lifted by the heel until the sole is turned straight up. On the first day the patient should get up several times without placing his foot upon the ground, but swinging the joint gently. This should be continued until there is no difference in the temperature of the healthy and the injured joint. Thereafter the patient is put upon his feet for very short intervals, this treatment being discontinued if there is any local elevation of temperature. To avoid jars or rolling of the joint perfect coaptation is needful. Hence when the patient first walks his leg should be held stiff in extension. The heel should be put firmly on the ground; thereafter the sole should be brought down so that two sounds occur with each step with an interval of one or two seconds between them. This has for its end the rolling of the articular surfaces upon each other in place of hammering, and the avoidance of limping, which in itself is a source of trauma to the joint.

Finally, the great toe should point directly forward and not out, thus lessening the traumatism to the internal condyle. Steps should be short and equal, the head held up, the shoulders square. This exacts energetic contraction of all the muscles.

The treatment thus outlined is applicable to recent effusions, but not in the least to those which are old, since walking almost immediately brings a hot and tender point at the tibial attachment of the internal lateral ligament. Before prescribing walking the muscular and ligamentous function must be restored by elevation and massage, and it is only when the kneecap is suddenly jerked from the grip of the finger and thumb that the walking is to be advised.

Thooris's tables apparently show an astonishingly rapid convalescence of cases thus treated. He states, moreover, that this is complete and permanent. He terminates his article by the statement that by forbidding the patient to limp the cure will be maintained.

GASTROENTEROSTOMY—POINTS IN TECHNIQUE.

The most frequent source of bad results after this operation is a position of the fistula causing the food to enter that part of the bowel which leads back to the stomach, and DELALOYE (*Deutsche Zeitschrift für Chirurgie,* lxxxiii, 6) proposes certain factors which he thinks lead to the bad results.

The first point is that the loop of the intestine selected must be as close as possible to the stomach, and not the first loop that comes to hand; secondly, it should always be sewed antiperistaltic. The third point is that the opening in the stomach must not be larger than the lumen of the loop of bowel. If these rules are followed there will probably be no trouble.

DISLOCATION OF THE SEMILUNAR BONE.

A very thorough study of these displacements has been made by TAVERNIER (*Paris Thesis,* 1906), who finds no good evidence of dislocation backward.

He divides all cases into three groups: (1) The semilunar is displaced from the scaphoid, cuneiform, and os magnum, but remains in connection with the bones of the forearm. The entire carpus except the semilunar is thus displaced in one piece, and rides on the dorsal surface of the semilunar. (2) The bone shows the same relation to the carpus, but has lost its connection with the radius, the radial surface being turned backward. (3) The semilunar retains its connection with the carpus, and the entire carpus is displaced forward on the forearm. The semilunar always is in

connection with the palmar fragment. The most striking symptoms are those due to compression of the nerves in the palm and the mass formed by the bone on the palm of the hand. Reduction is usually easy in recent cases, and is performed by the surgeon flexing the hand on the wrist and exerting strong traction on it while an assistant presses the bone back into place. If reduction is impossible the extirpation of the bone is indicated, and if any of the other bones of the carpus are fractured the fragment should be removed at the same time. Operative reduction rarely gives good results.

HYSTERICAL CONTRACTURES—TREATMENT BY SPINAL ANESTHESIA.

The muscular contractures which sometimes remain after injury and which have no demonstrable lesion to account for them are relieved, according to LOEHRER (*Münchener medicinische Wochenschrift,* No. 32, 1906), by the injection of anesthetics into the spinal canal.

He mentions two cases, in both of which an injury had been followed by paralysis of the legs, with contractures and pains in the muscles. In the first the anesthesia was used by chance for a slight operation, and when the effect passed off it was found that the contracture had disappeared. In the other case it was used with the idea of curing the paralysis, and was even more strikingly successful. The author thinks the method is worth trying in all cases of traumatic neurosis.

URETHRAL STRICTURE—RADICAL CURE.

The method of choice, according to PHELIP (*Lyon Médicale,* No. 33, 1906), is gradual dilatation, and if this does not cure, or more rapid cure is desired, external urethrotomy should be performed, internal urethrotomy being discarded entirely.

The methods in use for dilatation are permanent dilatation with rubber catheters, temporary with metal sounds, and electrolysis. It is best to use in each case several of these successively or alternately, as the inflammatory reaction is thus lessened. After dilating the stricture, it is necessary to leave as long a time as possible before the next treatment, as too frequent use of sounds causes an inflammatory reaction which increases the original trouble. At least eight days must be left, and if treatment is required before this time another method must be used. The interval becomes greater gradually, and after a few treatments should be increased to several weeks, and then to several months. At this time the catheter may be given to the patient if he is shown how to use it, and not allowed to use it too often. If such methods do not cure, or if immediate cure is required, recourse must be had to external urethrotomy. Internal urethrotomy, even if deep, may lead to recurrence after many years, when there is no sign of return in two or even three years.

SUTURE OF THE ESOPHAGUS—USE OF SLICES OF THYROID GLAND.

The good results obtained by the use of the mobilized thyroid gland in covering wounds in the esophagus led NAVRATIL (*Deutsche Zeitschrift für Chirurgie,* lxxxiii, 6) to try the effect of covering the wound with thin slices of the gland.

The great difficulty in the healing of wounds of this organ arises when a portion is excised, and it was here that the method showed its great value. A piece of the esophagus 3 centimeters long was excised from a dog, after the thyroid gland had been excised and cut into three fine slices, which were sewed together, forming a long band. The band is laid under the esophagus before this is sutured, and is fastened to the muscularis by four silk sutures. The posterior part of the muscularis is then sewed with separate sutures, the mucosa continuously, and the anterior part of the muscularis. Finally the anterior part of the thyroid is put in place. It is not possible to fix the band in place after the ends have been united. Sections of goitres are of no

value for this purpose. In cases in which part of the wound was covered with thyroid and the rest with a strip of muscle laid on circularly the wound healed well, but a stricture resulted. If the wound separates, the thyroid has no influence in preventing mediastinitis, but this may be prevented by sewing both ends of the esophagus into the skin wound. In the cases in which thyroid was alone used there was no stricture.

A CASE OF MESENTERIC THROMBOSIS.

MUNRO SMITH (*Bristol Medico-Chirurgical Journal,* vol. xxiv, No. 93, 1906) reports the case of a healthy man, forty-five years old, who sixteen days before his admission to the hospital was seized with a severe but not crippling pain in his belly. After two hours he went home to bed, but the next day got up to dinner, and after eating stuffed pork suffered violent pains in the upper part of the abdomen and chest, and vomited. Thereafter he vomited daily. His bowels were opened four days before he entered the hospital. When examined by Munro Smith there was no distention; the abdomen was slightly tender on palpation. The pulse was soft and regular. The enema brought away a fairly semisolid motion without sign of blood. Two days later, because of the steady failure of the patient's condition, he was opened. There was found a three-foot coil of ileum, purplish and mottled, with blue and dull-red patches, showing no sharp line of demarcation between the healthy and unhealthy gut. There was no marked distention. He died the day following operation, three weeks from his initial symptom.

The autopsy showed that the mesentery was full of small thrombosed vessels. The superior mesenteric artery was occluded by a thrombus about four inches long extending from three to seven inches from the orifice of the vessel. The upper part of this thrombus was firm, the lower part was softer and more recent. The mesenteric veins were also extensively thrombosed. There was no cardiac lesion nor atheromatous patches in any of the arteries. The author notes that about 170 cases of mesenteric thrombosis have been recorded, the great majority being of the superior mesenteric vessel, not the inferior, the proportion being as great as forty to one, and that the arteries are more frequently blocked than the veins, as five to one. It is noted that there are no symptoms which enable a correct diagnosis to be made during life, and even should this be made by opening the abdomen there is little or nothing to be gained toward the patient's relief.

REFLEX ANURIA CAUSED BY CYSTOSCOPY.

In a case of one-sided tuberculosis, GRUND (*Münchener medicinische Wochenschrift,* No. 37, 1906) saw complete anuria lasting over half an hour follow cystoscopy. After injection of indigo-carmine the urine was colored in ten minutes; the cystoscope was then introduced, and no further secretion occurred for thirty-five minutes, but as soon as the instrument was withdrawn secretion began again. The cystoscope was again introduced, and forty minutes after the first introduction the urine began to flow from the ureter of the better side. No secretion was observed from the diseased side. The left kidney was found by tests to be normal. Excision of the right kidney was advised, but refused. The author warns against accepting the results of such examination, unless reflex anuria can be excluded.

IODINE AS AN ANTISEPTIC.

A 5-per-cent solution of iodine in ether is used by ISAMBERT (*Gazette des Hôpitaux,* 110) in the treatment of open, suppurating surfaces. He fills the abscess cavity or ulcer with this solution, and finds that after the ether has evaporated the wall is covered with a thick layer of pure iodine. One application is ordinarily sufficient. The same treatment is adapted to chronic fistulas. If preferred a 10-per-cent iodine petrolatum may be substituted, or gauze soaked in a 10-per-cent solution in ether and the cavity filled with this.

REVIEWS.

DISEASES OF THE NOSE, THROAT, AND EAR. By Charles Prevost Grayson, A.M., M.D. Second Edition, Revised and Enlarged. Illustrated. Lea Brothers & Company, Philadelphia and New York, 1906.

When the first edition of this book appeared four years ago we cordially recommended it to our readers as being a first-rate practical work upon this important special subject because it presents the various clinical facts as to diagnosis and treatment in such a form as to be useful to the general practitioner. It is now better than ever. Almost every plan of treatment which is recommended is accompanied by a formula showing exactly what the author would apply should the same case be presented for his consideration. There are also a very considerable number of anatomical and pathological cuts designed to illustrate the normal and abnormal states which are met with in the areas of the body which are discussed in its pages, and the colored plates, which have been made by Mrs. Chase, are excellent illustrations of the pathological conditions which the author desires to describe, not only in words but in form. The book does not profess to be an exhaustive work upon the entire field, but is intended as an aid to the specialist and to the general practitioner who by desire, or force of circumstances, is required to deal with cases of this character.

A PRACTICAL TREATISE ON MATERIA MEDICA AND THERAPEUTICS. With Especial Reference to the Clinical Application of Drugs. By John V. Shoemaker, M.D., LL.D. Sixth Edition, Thoroughly Revised. The F. A. Davis Company, Philadelphia, 1906. Price, $5.00.

Dr. Shoemaker's work upon Materia Medica and Therapeutics is so well known that a complete description of it is unnecessary. The opportunity has been taken to make this edition conform to the new United States Pharmacopœia. A number of new therapeutic agents are considered, not only in the way of drugs, but such non-medicinal remedies as the Roentgen rays, Finsen light, Vibro-therapy and Hydrotherapy. Much of the information which formerly existed in Part I of the special edition designed for students, in distinction to that for practitioners, has been introduced in this volume, and we presume that the idea of dividing the book into two parts has now been given up, which we think is wise. When we remember that the chapter on remedial measures other than drugs includes such things as music, light and darkness, and diet, we can gain some conception of the wide scope of the text. Shoemaker's Therapeutics is not only a creditable production from the standpoint of the author, but a valuable member of the group of books in this department of medicine in which America stands preëminent.

PULMONARY TUBERCULOSIS: ITS MODERN AND SPECIAL TREATMENT. By Albert Philip Francine, A.M., M.D. Illustrated. The J. B. Lippincott Co., Philadelphia and London, 1906.

Dr. Francine, who is one of the staff of the Henry Phipps Institute of Philadelphia and the White Haven Sanatorium, has prepared this small octavo volume of 250 pages with the idea of presenting to his fellow practitioners the methods which are employed in these two institutions and elsewhere for the treatment of tuberculosis. It does not profess to be a treatise upon hygiene nor therapeutics, nor indeed does it profess to discuss all the views which are held by many of those who are particularly interested in combating this malady. On the contrary, it is an interesting summary of what Dr. Francine does, or would do, when put in charge of a case of pulmonary tuberculosis, and as he has ample opportunities for carrying out clinical observations upon these cases and has the ability to take advantage of these opportunities, he has compiled for the general practitioner a useful little handbook which can be recommended not only to the doctor

but to the trained nurse as well, particularly if the latter is to be put in charge of cases of this character.

LECTURES TO GENERAL PRACTITIONERS ON DISEASES OF THE STOMACH AND INTESTINES. With Special Relation to Other Diseases. By Boardman Reed, M.D. Illustrated. Second Edition. E. B. Treat & Company, New York, 1907. Price, $5.00.

The first edition of this book was well received in this country and in England. The form of the text is not conducive to conciseness, but the text shows that the author has not only made a thorough study and investigation of the subject, but has also had wide experience in the treatment of the conditions under consideration. One criticism of the book is that it is not equal in its consideration of various topics, which is largely dependent upon the fact that it embodies his views as expressed in lectures rather than in text. It is not the book to be recommended to the medical student, but is emphatically one which will prove of interest to the general and special practitioner.

PROGRESSIVE MEDICINE. A Quarterly Digest of Advances, Discoveries, and Improvements in the Medical and Surgical Sciences. Edited by H. A. Hare, M.D., Assisted by H. R. M. Landis, M.D. Volume IV, December, 1906. Lea Brothers & Company, Philadelphia and New York, 1906. Price, $2.00, or $6.00 a year.

The contributors to this last volume of Progressive Medicine for 1906 are Dr. William T. Belfield, who writes the article upon Diseases of the Genito-urinary Tract not including Syphilis; Dr. Joseph C. Bloodgood, who contributes the article upon Fractures, Dislocations, and Surgery of the Extremities; Dr. John Rose Bradford, who writes upon Diseases of the Kidney; and Dr. J. Dutton Steele, who considers the Diseases of the Digestive Tract and Allied Organs. Finally, there is a Therapeutic Referendum by Dr. Landis of about 100 pages, in which the advances in therapeutics during the past twelve months are carefully considered, and practical hints are given in regard to the administration of drugs and remedial measures other than drugs in the treatment of diseases. Dr. Bloodgood's article is one which no active surgeon can afford to do without if he wishes to keep himself thoroughly posted with the literature and practice of his department, and the same thing may be said of Dr. Steele's article upon Diseases of the Stomach, Intestines, and Allied Organs. It is a carefully prepared summary of the subject and embodies a careful description of the author's own views and practices as well as the authors whom he quotes.

ELEMENTS OF MEDICINE. By Alfred H. Carter, M.D., M.Sc. Ninth Edition. H. K. Lewis, London.

The ninth edition of this small octavo volume is much more familiar to our English brethren than to American readers. It does not profess to be a complete and exhaustive description of the diseases which are commonly met with in the practice of medicine at the present time, but rather lies in the scope of its consideration of these topics between a quiz-compend and a fairly complete small manual. The volume closes with a so-called therapeutic index, in which prescriptions are given for a large number of conditions. After going over the book we fail to see how it can meet the needs of either the practitioner or the student. It is not exhaustive enough to be used as a work of reference, and it is too incomplete to be recommended as a text-book to the exclusion of larger volumes. The fact, however, that it has reached a ninth edition and is written by the Professor of Medicine in the University of Birmingham proves that whatever is in its pages consists of good material, the criticism being that it is too brief rather than that it is incorrect.

BACTERIOLOGICAL EXAMINATION OF WATER-SUPPLY. By William G. Savage, B.Sc., M.D. H. K. Lewis, London, 1906.

As the title of this book indicates, it is of far more interest to the public health officer and bacteriologist than to the general practitioner, and embodies the views and experiences which have been gained by its author in carrying out the work described in its pages. As is well said in the preface, many of the data upon which bacteriological ex-

amination of water is based have not passed beyond the regions of controversy, and many investigators employ methods which their colleagues do not approve of. The importance of the subject can, however, be appreciated when we find that the author can fill 278 closely-printed pages without wasting space, and when we find that the finely-printed "recent bibliography" covers about 15 pages.

CORRESPONDENCE.

LONDON LETTER.

BY G. F. STILL, M.A., M.D.

One of the most important scientific discussions of the month took place at the Royal Medico-Chirurgical Society when Dr. Hale White opened a discussion on the operative treatment of gastric ulcer. He pointed out that there are several phases of gastric ulcer which might call for operative interference; the most urgent and indisputable is perforation. When this occurs life depends upon promptness in diagnosis and in surgical measures for the closure of the perforation. If there is a doubt as to diagnosis it is certainly right to explore, for in almost all the conditions which simulate perforation of a gastric ulcer laparotomy is necessary. There are, however, two diseases which sometimes simulate this accident closely, namely, hemorrhagic pancreatitis and hysteria, in which laparotomy is undesirable treatment. Some authorities hold that severe hemorrhage is an indication for operation in some cases of gastric ulcer; Dr. Hale White, however, has found medical treatment almost always effectual in cases in which the bleeding is from a general oozing from the stomach wall, whilst where it is due to ulceration into a vessel death often results directly from operation, and even if the patient survives the operation the hemorrhage is sometimes quite uncontrolled. There are cases in which hemorrhage without killing the patient renders her a chronic invalid by its frequent recurrence, and in such cases if medical treatment fails it might be advisable to make an anastomosis between the stomach and the small intestine. In other cases, owing to adhesions between the ulcerated stomach and adjoining coils of intestine, the patient suffers from recurring abdominal pains, which might be severe and sufficient to cause much interference with health and comfort. Operation might give permanent relief in such cases. Another condition in which surgical treatment is usually more effectual than medical is the extreme dilatation of the stomach which sometimes results from an ulcer near the pylorus.

Dr. Hale White concluded with a warning that in none of these conditions is operation free from risk; moreover, operation sometimes entirely fails to relieve the symptoms, and if gastrojejunostomy is performed there is sometimes regurgitation of food from the bowel.

Mr. Mayo Robson described his own experience of operative procedures in such cases, and showed that the mortality is little over 3 per cent, whilst the mortality from medical treatment is about 33 per cent. I shall not quote his remarks here, for they have been published in full elsewhere; suffice it to say that he made out an excellent case not only for the operative treatment of perforation and hemorrhage, but also for the tetany which results from the dilatation of the stomach consequent on gastric ulcer, and for the hour-glass constriction which is also usually a result of gastric ulcer. Sir Dyce Duckworth was of Dr. Hale White's opinion that operative treatment is very rarely advisable for gastric hemorrhage; he said it is very rarely fatal, and although operation has occasionally been successful, it has also failed completely. He was in favor of prolonging the medical treatment of gastric ulcer for

many weeks, or if possible for months. Rectal feeding is particularly useful, and he doubted if it is a "starvation diet," as it has been called.

Gonorrhea was the subject of discussion one day this month at the Hunterian Society. The arthritis especially was considered; this occurs at any stage of the disease, but especially in the late stage, and equally in either sex. The so-called puerperal synovitis is often gonorrheal, and it seems likely that cases of "rheumatoid arthritis" are sometimes gonorrheal in origin. On the other hand, as one speaker mentioned, the patient with an arthritic diathesis is specially liable to gonorrheal arthritis. It is clear that the diagnosis may not be easy, for the finger joints may be affected, and sometimes even the metatarsophalangeal joints alone; the presence of extensive edema is a characteristic of the gonorrheal infection, but sometimes the resemblance to tuberculous arthritis is very close. As to the treatment, various opinions were expressed; one was in favor of intermittent constriction of the limb; another had found fixation in splints useful during the acute stage. Dr. MacMann recommended aspiration of the joint where there is effusion, and incision if any pus is found. Injection of antistreptococcic serum is found useful in some cases.

At a meeting of the National Health Society Sir Frederick Treves has recently been holding forth upon the food supply of this country. He said that whilst on the whole it is good, there is no guarantee often of its purity: the public, he said, do not seem to mind anything they cannot actually see, and as the bacillus of typhoid is not as large as a tadpole they seem to have no objection to swallowing it. The treatment of our meat is in no way better than in the days of the cave-dweller. The cave-dweller indeed had the advantage of us: he saw the meat killed, we do not; but he carried the joint on his bare head, so do we; he deposited it on a dirty floor, so do we; he kept it exposed to any dust which might be flying about, so do we. After all, we are no whit in advance of neolithic man. Sir James Crichton-Browne followed in the same strain, and evidently fresh from a perusal of "The Jungle." He said that canned and preserved foods are excellent in their way, but not on the whole so nutritious as fresh meat; in some instances the process used to protect them from decay protected them also from digestion. As, however, tinned meat is a necessity it is only right that it should be properly inspected and tested. He would abolish all private slaughter-houses.

The new buildings of University College Hospital, which owe their existence to the munificence of Sir Blundell Maple, were formally opened this month by the Duke and Duchess of Connaught. The new building cost two hundred thousand pounds, and since its erection Sir Donald Currie has completed the scheme by a gift of a hundred thousand pounds for the erection of a school of advanced medical studies, a home for nurses, and a home for students attending midwifery, whilst his daughters gave another large sum of money to furnish the new nurses' home. There was a distinguished gathering to meet their royal highnesses, and after the usual speechifying the hospital was solemnly declared open, having been in active use for many months past, and open to all comers. But still the solemn declaration must be made, so the duke made it, gracefully enough, and the trumpets played a great flourish and the architect presented his royal highness with a golden key, and it is to be hoped that the hospital will live happily ever after.

Sir James Crichton-Browne made a statement recently that butter in this country could hardly ever claim even a courtesy-title of "genuine;" it was more properly described as "clarified grease." Certainly it is "doctored" in the most shameless manner with pigments, foreign fats, and preservatives. Some years ago a Government Commission was appointed to consider the question of preservatives in food, but the evidence was somewhat conflicting and the outcome not very useful; so there is to be a conference held at the Institute of Hy-

giene shortly under the presidency of Professor Tunnicliffe to discuss preservatives in food, their use and abuse.

Great indignation is being expressed by the antivivisectionists at the persistence of the Royal Commission in holding its sittings privately. No doubt they hoped for some "revelations" which they might convert into harrowing "copy" for the baser sort of half-penny newspapers; but if the present government has shown itself lamentably feeble in most things, it deserves thanks for withstanding the clamor of mischief-making faddists in this matter.

A satisfactory and somewhat novel decision has just been given in a law court against a vender of a quack medicine, who was prosecuted by the Crown for obtaining by false pretenses money for worthless powders which were advertised as being a cure for all manner of diseases. The powders were found to consist of sodium bicarbonate and potassium bromide, and the advertisements stated that this wonderful medicine had been discovered by two clergymen in some part of Africa. The powder had been sold for many years, no doubt bringing in a handsome revenue to the proprietor, who advertised it also in the name of clergymen who were supposed to have derived benefit therefrom. This benefactor of the public is sentenced to three months' hard labor in prison, and the judge in passing sentence wished success to the Crown in undertaking prosecutions of this kind.

Amongst the recent birthday honors conferred by his majesty the king every one was pleased to hear of knighthood for Mr. Tweedy, the ophthalmic surgeon who held the office of president of the Royal College of Surgeons for two years. Sir Victor Horsley has just resigned his professorship of clinical surgery and his post of surgeon at University College Hospital, on account of pressure of many other duties.

Two distinguished London physicians have passed away this month—Dr. Schorstein, who was on the staff of the London Hospital, and Dr. Symes Thompson, who was consulting physician to the Brompton Hospital for Consumption. The death of Mr. George Herring also has removed a munificent supporter of our London hospitals.

"PRINCIPIA THERAPEUTICA."

To the Editor of the THERAPEUTIC GAZETTE.

SIR: It would be very unreasonable in a writer to take exception to a review of his writings because of an adverse opinion expressed. He must take the favorable and the unfavorable, and prepare himself to accept the latter with fortitude.

It is otherwise, however, in the case of a clear misstatement, for he is bound to protect himself against a false impression. It is for this reason I write, in the assurance that you will help me to do myself justice. The review of my book Principia Therapeutica in the November 15, 1906, number of your journal is very brief. Detailed criticism is, of course, impossible within so limited a space; nor is this attempted, for indeed the only criticism is upon the chapter headed "Imponderabilia." In this your reviewer says "there is a brief discussion of the forces of light, heat, and electricity, which however is so brief and inadequate and so superficial that it is of no practical value in medicine, however interesting it may be as representing Dr. Sainsbury's views."

Now if this criticism means anything it is that the Imponderabilia are the forces light, heat, and electricity, and that the chapter in question discusses these primarily and essentially; whereas the forces above mentioned are only brought in incidentally, as it were, in order to exclude them *as not deserving their old name of imponderable*. The Imponderabilia which I discuss are something quite different, and to them the chapter is devoted essentially. Whether they are discussed superficially or exhaustively it is not for me to say, but that I have attempted any discussion, even superficial, of the forces of light, heat, and electricity "under the heading Imponderabilia" is a misrepresentation of fact which I trust you will help me to remove by publishing this letter.

I am, yours faithfully,

HARRINGTON SAINSBURY.